U.S. DEPARTMENT OF COMMERCE
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PB-259 452

Methodology and Measurements of Benefits of Pollution Abatement in a Community

Pittsburgh University, Pennsylvania

Prepared For
Environmental Protection Agency, Washington, DC

June 1976

BIBLIOGRAPHIC DATA SHEET	1. Report No.	2.	3. Recipient's Accession No. PB-259 452
4. Title and Subtitle Methodology and Measurements of Benefits of Pollution Abatement in a Community.			5. Report Date June 1976 6.
7. Author(s) Robert F. Byrne, Michael H. Spiro, Catherine Marshall, and William Capitman.			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Pittsburgh University Pittsburgh, Pennsylvania Graduate School of Business			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered 14.

15. Supplementary Notes

Prepared in cooperation with Florida International University, Miami.

16. Abstracts

The report presents the results of the development and successful pilot implementation of a methodology for assessing the benefits of pollution abatement in a community. The measure of the benefit is based on the concept of the maximum reduction in income people would voluntarily be willing to forego for a given reduction in pollution. The methodology, combining economic model building and social science survey techniques, was tested with a sample of 99 individuals, all residents of Clairton, Pennsylvania.

17. Key Words and Document Analysis. 17a. Descriptors

*Air pollution abatement
*Community relations
*Environmental surveys
Attitude surveys
Benefit cost analysis
Evaluation
Economic models
Social perception
Pennsylvania
Public opinion

17b. Identifiers/Open-Ended Terms

Willingness to pay
*Clairton(Pennsylvania)

17c. COSATI Field/Group 13B, 5J

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
National Technical Information Service Springfield, VA 22161	UNCLASSIFIED	98
	20. Security Class (This Page) UNCLASSIFIED	22. Price PC$5.00/ MF$3.00

FORM NTIS-35 (REV. 10-73) ENDORSED BY ANSI AND UNESCO. THIS FORM MAY BE REPRODUCED USCOMM-DC 8265-P74

PB 259 452

METHODOLOGY AND MEASUREMENTS OF BENEFITS OF POLLUTION ABATEMENT IN A COMMUNITY

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June 1976

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INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

ABSTRACT

The report presents the results of the development and successful pilot implementation of a methodology for assessing the benefits of pollution abatement in a community. The measure of the benefit is based on the concept of the maximum reduction in income people would voluntarily be willing to forego for a given reduction in pollution. The methodology combines economic model building and social science survey techniques.

The methodology was tested with a sample of 99 individuals, all residents of Clairton, Pennsylvania. The conclusions are that the methodology appears to provide a useful instrument for assessing public preference in regard to clean air, in particular, and the provision of public goods in general. The findings are that the individuals in this sample were very concerned about the quality of air and, furthermore, would be prepared to reduce their income for the sake of a cleaner environment. However, the results appear to overestimate the willingness to pay for a cleaner environment because research budget limitations restricted the size and composition of the sample and the selection of the variable used to measure pollution levels.

This report was submitted in fulfillment of Contract No. 68-01-1876 by the Graduate School of Business, University of Pittsburgh, under sponsorship of the Environmental Protection Agency. Work was completed in March 1976.

CONTENTS

	Page
Abstract	ii
List of Tables	iv
Acknowledgements	v
I. Conclusions	1
II. Recommendations	2
III. Introduction	3
IV. Models and Methodology	5
IV.1 The Model	5
IV.2 The Questionnaire, The Sampling Process	10
V. Analysis of Data	13
V.1 Index Construction	13
V.2 Estimation of Parameters	18
V.3 Calculation of Willingness to Pay	24
VI. The Questionnaire	29
Appendix A: Review of Literature	44
Appendix B: Economic and Demographic Characteristics of Clairton, Pa.	65
Appendix C: Analysis of the Perception of Major Social Problems	73
Appendix D: Explanation of Questionnaire Design	91

TABLES

No.		Page
1	Comparison of Clairton Population with Sample Population	12
2	Factor Loadings	15
3	Independent Variables in Regression	23
4	Total Population, Clairton City, 1910-1970	66
5	Population of Clairton by Age 1950-1970	67
6	Population of Clairton by Parentage and Race 1910-1970	68
7	Employees by Industry Group	68
8	Labor Force of Clairton by Occupation & Sex 1950-1970	69
9	Median Family Income	69
10	Housing in Clairton	70

ACKNOWLEDGEMENTS

Robert F. Byrne, who died in December of 1973, was Associate Professor of Business Administration at the University of Pittsburgh and made major contributions to the formulation of this investigation.

William Capitman was Professor of Business Administration at Florida International University. He participated actively in all phases of this investigation but died in July of 1975 prior to the completion of the analysis and the writing of certain sections of this report.

John Cipkala has been a dedicated and extremely valuable research assistant. We are also indebted to our colleagues, Professors Jacob Birnberg, James Craft, Josephine Olson, Ed Sussna, Gerald Zaltman, Cyrus Mehta, and Robert Perloff for their comments on an earlier version of this report and the opportunity to consult with them throughout the investigation.

I. CONCLUSIONS

The methodology developed in this investigation demonstrates the feasibility of combining economic model building and social science survey techniques for the purpose of studying the preferences of the public in regard to pollution abatement. This methodology can also be applied to the study of preferences in regard to other collective goods for which the market does not generate explicit or implicit prices.

The index of subjective well-being which is an integral part of this methodology and which rests on the assumption that meaningful interpersonal comparisons of well-being can be made, appears to have the properties one would expect based on partial correlations with objective demographic and economic data.

The results of the pilot application of the methodology clearly indicate that the people of Clairton are concerned about pollution and are willing to make sacrifices in their material standard of living in order to reduce pollution. However, because of the substitution of subjective pollution assessment for objective measurement, due to cost of sampling and budget constraints, the results appear to have an upward bias. This shortcoming can, however, be rectified through replication in a sample consisting of numerous communities with different levels of pollution.

II. RECOMMENDATIONS

This study was intended to be exploratory in nature. Based on our conclusion that the results have demonstrated that the methodology has merit and could provide a valuable additional approach to the measurement of the benefits of pollution abatement, it is recommended that:

The experiment should be replicated in ten communities across the United States with widely differing pollution levels and utilizing a total sample of about 1000 individuals. The replication of this experiment will eliminate the hypothesized upward bias in the coefficient of the pollution variable. In choosing the communities care should be exercised to insure that the pollution variable is not highly correlated with some other attribute of the community. Furthermore, items in the questionnaire should be omitted which did not contribute significantly to the construction of the index of well being, or to the explanation of the variation in the index across individuals.

Based on the data collected above, additional analysis should be undertaken on the relationship between the levels of different pollutants and perception of the quality of air. This study can readily be undertaken at little cost as a byproduct of the primary study and would provide valuable information for understanding public reaction to environmental issues pertaining to the quality of air.

III. INTRODUCTION

The measurement of the benefits of pollution abatement is an essential input into the determination of optimal goals for public policy in the environmental area. It is well known that the collective nature of air pollution precludes the formation of prices. Margolis has discussed the various issues and reviewed some of the methodologies for imputing shadow prices to public goods.[1] All of these methods, including those of Izraeli, Lave and Seskin, Sinden, and Paul, while making important contributions to the measurement of the valuation of piblic goods, are all a "second best" solution either because of methodological considerations or the restrictive nature of the study.[2] Lave and Seskin, for example, restrict themselves to the health impact of air pollution and face the difficult task of assigning monetary values to human life. Izraeli aggregates over metropolitan areas and is unable to handle the implications of the very large variation of pollution levels within SMSA's that may affect residential location. Since no definitive methodology exists or is likely to emerge, and given that the issue is of fundamental importance to public policy, the best that can probably be expected is that a variety of imperfect approaches will result in estimates which are judged to be of the same order of magnitude.[3]

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[1] Julis Margolis, "Shadow Prices for Incorrect or Nonexistent Market Values," in Public Expenditure and Policy Analysis, ed. R. H. Haveman and J. Margolis (Chicago: Rand McNally, 1970): 314-329.

[2] Lester B. Lave and Eugene P. Seskin, "Air Pollution and Human Health," Science 169, no. 3947 (21 August 1970): 725-733; Oded Izraeli, "Differentials in Nominal Incomes and Prices Between Cities," Ph.D. dissertation, University of Chicago, 1973; J. A. Sinden, "A Utility Approach to the Valuation of Recreational and Aesthetic Experiences," American Journal of Agricultural Economics 56 (February 1974): 61-72; M. R. Paul, "Can Aircraft Noise Nuisance be Measured in Money?" Oxford Economic Papers 23, no. 3 (November 1971): 297-322.

[3] For a recent exploration of these issues the reader is referred to an essay by Steiner in which he discusses at length the deficiency of the various approaches to the articulation of the public interest in regard to collective goods. He, furthermore, advocates the collection of attitudinal information by the technique of survey research. Peter O. Steiner, "Public Expenditure Budgeting," in Blinder, et al., The Economics of Public Finance (Washington, D. C.: The Brookings Institution, 1974), especially pages 280-282.

This paper presents a methodology for the measurement of the benefits of pollution abatement in a community. It attempts to estimate the total income members of a community would be willing to forego, without being worse off, if pollution were reduced by a given amount. The methodology is interdisciplinary in nature, combining research techniques widely used in psychology and sociology with economic model building.[1]

[1] An example of a sociological approach to the problem is: Robert H. Orr, "The Additive and Interactive Effects of Powerlessness and Anomie Predicting Opposition to Pollution Control," Rural Sociology (Winter 1974): 471-486.

IV. MODEL AND METHODOLOGY

IV.1 The Model

The model underlying this study can be cast in a framework presented by Katona and attributed to Strumpel.[1] According to this model the level of subjective well-being (SW) of an individual is determined by objective environmental factors (E) such as income, assets and debts, and by personal factors such as goals and values (P). Subjective well-being combined with objective factors and personal factors are in turn the determinants of behavior (B) and what Katona calls "societal discontent" (SD). This analytical scheme is presented in Diagram 1.

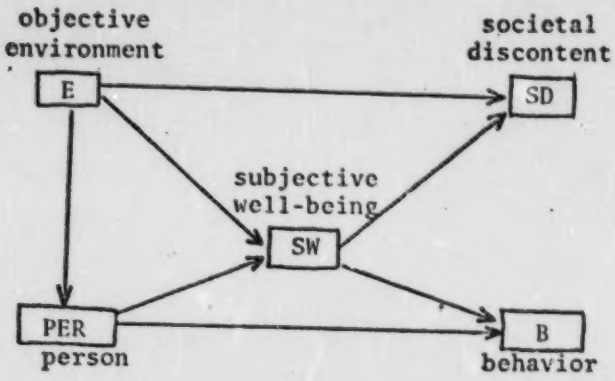
This conceptual model is clearly richer than the conventional economic model based on a utility maximization assumption in that it incorporates variables not considered in the standard consumption model.[2] Furthermore, through the addition of a link from behavior (B) to objective environment (E) the model could be expanded to incorporate the utility maximization hypothesis since it could now allow for the interpretation that behavior is intended to modify the objective environment in order to increase the subjective well-being (SW).

Given the task of measuring the benefits of pollution abatement, one could conceivably employ this model and focus one's attention on the link between objective environment and societal discontent. Yet the fundamental problem of the economics of collective goods remains: how does one value societal discontent or variations in it? This question must be answered if one is to employ information about attitudes and psychological states in the development of policies that would result in an optimum level of pollution abatement.

---

[1] George Katona, Psychological Economics (Elsevier, 1975): 383.

[2] For a more detailed discussion see James Tobin, "Wealth, Liquidity, and the Propensity to Consume," in Human Behavior in Economic Affairs, ed. B. Strumpel et al., (San Francisco: Jossey-Bass, 1972): 37-56.



E: Objective Environment
real income
employment, marital status,
and pollution

SD: Societal Discontent
dissatisfaction with prices,
employment, government policies,
political system

PER: Person
goals/aspirations
preferred life styles
notions about equity
self-efficacy, fate control

B: Behavior
consumption demand
saving
working
occupational choice
education
retirement

SW: Subjective Well-being
satisfaction with income,
savings, standard of living
economic attitudes and
expectations
sense of opportunities

Figure 1

In this investigation an approach will be used that combines the theory and methodology of social surveys with classical economic theory. Assume that the subjective well-being of individual i (SW_i) is a function of objective variables (E_i), where E is a vector containing such variables as income of individual i, Y_i, marital status M_i, employment status ES_i, race R_i, sex S_i, and health H_i, and variables pertaining to the community and specifically to the level of pollution in the community P. Symbolically they can be presented by the following expression.

(1) $$SW_i = f \quad (Y_i, ES_i, MS_i, R_i, S_i, H_i \ldots\ldots\ldots\ldots P)$$

This function can be depicted geometrically as in the Diagram 2 in which all variables except for SW, Y and P are held constant.

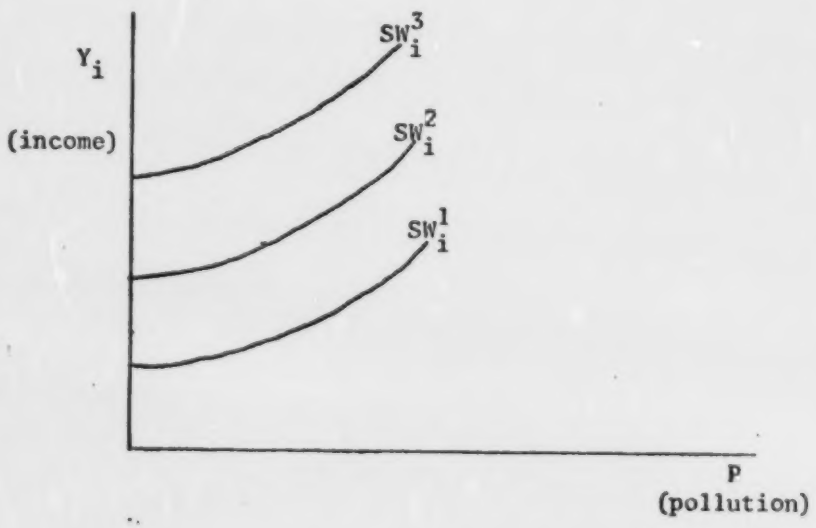


Figure 2

The slope of any curve can be interpreted as the maximum amount of income an individual would be willing to forego for a given reduction in pollution without being worse off; thus, by differentiating the function, setting the derivative equal to zero and solving for dY/dP, an expression is derived which theoretically contains the desired information on the marginal valuation of pollution abatement by individual i.

Thus, the change in SW, dSW, is:

$$dSW = \frac{\partial SW}{\partial Y} dY + \frac{\partial SW}{\partial P} dP + \ldots\ldots$$

Assuming all variables except income and pollution to remain constant, and setting the expression equal to zero to ensure that the level of subjective well-being remains unchanged, one derives the following expression:

$$\frac{dY}{dP} = \frac{-\partial SW/\partial P}{\partial SW/\partial Y} .$$

By assumption, the level of subjective well-being is positively related to income and negatively to the level of pollution, or $\partial SW/\partial Y > 0$, $\partial SW/\partial P < 0$. Once a quantitative estimate for the expression dY/dP has been made, it can be interpreted as the amount of income individual i would be willing to forego for a given reduction in pollution, dP, without being worse off. In order to determine the aggregate measure for a community one can employ the argument provided by Bowen for the measurement of demand for collective goods, that is, add up the "willingness to pay" for all members of the community.[1] Aggregate willingness to pay, which can be interpreted as a measure of the perceived benefits of pollution abatement in the community (BPAC) can be expressed as:

$$BPAC = \sum_{1=1}^{n} \frac{dYi}{dP}$$

---

[1] See Howard Bowen, Toward Social Economy (New York: Holt, Rinehart and Winston, 1948).

It should be noted that the model is a simplified version of that presented by Katona insofar as SW is specified only as a function of objective variables but not as a function of the personal variables. This simplified formulation reflects a concern over our ability to measure and differentiate properly in our questionnaire design and data analysis between such concepts as goals or aspirations and notion of equity, and the concept of well-being (SW); if we include the former as explanatory variables for SW, the possibility exists that measurements of similar concepts would end up on both sides of the equation. Thus, we decided to restrict the explanatory variables to objective as distinct from the more subjective attitudinal data. Only two exceptions were made: (1) since cost considerations required that the sample be taken in only one community we do not have variations in pollution across observations and, thus, substituted a subjective evaluation by our respondents of the level of pollution as a proxy for pollution; and (2) we included subjective assessment of the state of health of an individual as a proxy for his or her actual health.

Theory does not provide clear guidance as to the appropriate explicit formulation of the function specifying subjective well-being and, thus, a number of specifications will be investigated. If for expositional convenience all the objective factors except for pollution are defined as vector X then the specifications to be considered are:

(2a) $SW = a + \alpha Y - \beta P + \lambda X$ implying: $dY/dP = \frac{\beta}{\alpha}$

(2b) $SW = aY^{\alpha} P^{-\beta} X^{\lambda}$ implying: $dY/dP = \beta Y/\alpha P$

(2c) $SW = a + \alpha \ln Y - \beta P + \lambda X$ implying: $dY/dP = \beta Y/\alpha$

The first formulation implies that the willingness to forego income for pollution abatement is independent of income or pollution. The second implies that it is a function of both but the elasticity of income with respect to pollution is a constant. That is, regardless of income level or pollution level an individual would be willing to forego the same percentage of income for a given percentage reduction in pollution. The third formulation implies that the amount of income an individual is willing to forego for a given reduction in pollution is a function of his income but independent of the level of pollution.

The sensitivity of the "willingness to pay" estimate to the specification of the function will be examined, but the final choice of the function will be based on a goodness of fit criterion.

Katona and Strumpel have emphasized in their writing that a central objective of survey research is the study of the functional relationships between economic and psychological variables through time and that the results of any single survey should be interpreted with great caution.[1] If cost were of no concern and sufficient time were available this would entail performing time series analysis on individuals exclusively, thus avoiding the difficult problems of interpersonal comparisons of attitudes which are inherent in cross section analysis. In the absence of historical data, however, we have no option but in Strumpel's words, "to analyze differences on the cross section level, and to initially approach time series variance per analogian."[2]

Thus, reluctantly the assumption is made that the mechanism which transforms variations in objective environmental factors into reported measures of subjective well-being are the same across individuals and that, therefore, variations in reported contentment are primarily due to variations in objective factors.

IV.2 The Questionnaire, The Sampling Process

The hypothesis postulated in the previous section requires information on individuals that will permit the development of a measure of subjective well-being, and, second, objective data that will explain variations in this measure and permit the estimation of parameters essential for calculating the trade-off between pollution and income.

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[1] See G. Katona, Psychological Economics, p. 409, and B. Strumpel, "Economic Behavior and Economic Welfare: Model and Interdisciplinary Approaches," in Human Behavior, ed. B. Strumpel et al.: 83-106.

[2] B. Strumpel, "Economic Behavior," p. 106

The questionnaire used in the study (presented in section VI) was designed to explore the existence of differential social and psychological states and patterns of behavior which had been observed in preliminary group and individual depth interviews. Specifically, we hoped to be able to measure the relationship between pollution (and its abatement) and the "satisfaction with the quality of life" of the people living in a small city near Pittsburgh, Pennsylvania. The questionnaire consisted of 235 items organized in 31 questions, some adapted from studies reported in psychological and sociological literature and some originated by the authors. Major sections of the instrument were as follows:

1. Demographic data covering the respondent's age, sex, race, marital status, household composition, education, income, occupation, and state of health.
2. A series of questions and scales to measure satisfaction - with job, community,[1] general quality of life.[2]
3. Measures of psychological states - alienation,[3] authoritarianism,[4] happiness.[5]
4. Questions relating to awareness of, and concern over, pollution of the air and water in the community.

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[1] Adapted from Vernon Davies, "Development of a Scale to Rate Attitudes of Community Satisfaction," Rural Sociology 10 (1945): 246-255; and Clinton Jesser, "Community Satisfaction Patterns of Professionals in Rural Areas," Rural Sociology 32 (1967): 59-69.

[2] Based on a study by Norman C. Dalkey, R. Lewis, and D. Snyder, Measurement and Analysis of the Quality of Life (Santa Monica: The Rand Corporation, 1970).

[3] Adapted from Russell Middleton, "Alienation, Race, and Education," American Sociological Review 28 (1963): 973-977.

[4] Devised by N. Levinson and P. Huffman, "Traditional Family Ideology and Its Relation to Personality," Journal of Personality 23 (1955): 251-273.

[5] Adapted from Norman M. Bradburn and David Caplovitz, Reports on Happiness (Chicago: Aldine Publishing Co., 1965).

The questionnaire was administered in Clairton, Pennsylvania, during November and December of 1974. The sample of interviews was selected as follows: From each of Clairton's 7 census tracts 5 blocks were chosen using a table of random numbers. The interviewers were instructed to conduct 3 interviews on each block, and for the purpose of obtaining a stratified random sample, quotas were established for age, sex, and race. One hundred interviews were completed, yielding 99 usable questionnaires. A comparison of the sample with the population of Clairton is shown in Table 1.

TABLE 1

Comparison of Clairton Population with Sample Population

	Clairton	Percent of Population	Sample	Percent of Sample
Total Population	15,051		99	
Male	7,195	47.8	43	43.4
Female	7,856	52.2	56	56.6
White	11,258	74.8	75	75.8
Non-white	3,793	25.2	24	24.2
Age				
20-39	3,130	32.0	41	41.4
40-59	4,010	41.1	31	31.3
60 and over	2,625	26.9	27	27.3
	9,765	100.0		100.0

V. ANALYSIS OF DATA

Analysis of the data proceeded in two phases. Phase one involved the construction of the index of subjective well-being and, phase two, the testing of the hypotheses that variations in the index are explained by demographic, economic and environmental factors.

V.1 Index Construction

The notion of subjective well-being is a highly complex one. In attempting to arrive at an individual measure two approaches were utilized. Both indicators - single measures which are effective surrogates for a variety of measures - and indices - combined measures of related items, each of which is differentiated from the other items, but are highly correlated with a central concept or tendency were developed. Thus, the response to a scaled direct measurement of "contentment" was examined (question 31) and factor analytic techniques were employed, specifically principal component analysis, to reduce the data matrix which contains numerous micro variables pertaining to satisfaction of job, community, and environment, and the psychological states of the individual such as degrees of alienation, to indices of subjective well-being.

Our first approach to the development of an indicator of well-being was to use the responses to a question which essentially asked the respondent to assess his or her state of happiness (31).[1] In using measures of this kind, the question arises as to the empirical validity of the item, that is, how does one know that the response to the question indeed contains information on the variable to be measured? While this issue cannot be resolved, an attempt was made to determine whether the response to this 'macro' question about contentment was consistent with responses to numerous more detailed or 'micro' questions which can be viewed as representing components of general contentment.

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[1] Hereafter, numbers in parentheses refer to items in the questionnaire.

The experiment that was conducted consisted of a multivariate regression analysis in which the response to the question "How happy would you say you are?" served as the dependent variable. The independent variables consisted of the responses to such questions as sense of security (17d), the need to do wrong things to get ahead (16c), perceptions about people and the community (14c, 14r, 14n). In the absence of a well-structured theory about the components of well-being, step-wise regression was employed. The criterion used for identifying the equation to be subjected to further analysis was to choose the one that yielded the highest R^2 corrected for degrees of freedom ($\bar{R}^2$).

The results are that the highest R^2 corrected for the degrees of freedom is .38 (r is equal to .685). Furthermore, nine of the thirteen independent variables in the equation have coefficients whose signs are consistent with a priori expectations, while twenty-five independent variables did not enter the equation which resulted in the highest $\bar{R}^2$. It should be noted that in interpreting the signs of the coefficients, account must be taken of the format of the question. For instance, in evaluating a response to the statement about the need to do things that are not right if one wishes to get ahead (16c), one would expect that a person who strongly disagrees is probably more content than a person who agrees. Given that a low score on this question would indicate strong agreement, one would expect that the higher the disagreement the greater the happiness. That is, other things being equal the higher the score on question 16c the lower the score on question 31. Using similar analysis the signs of all the coefficients have been evaluated with the results cited above. These results can hardly be viewed as constituting overwhelming evidence to support our confidence that question 31 is an adequate measure of happines. It is our view, however, that the results of this analysis do reduce somewhat the doubts one may have about the meaningfulness of this indicator of subjective well-being.

A second approach to index construction consisted of the use of principal component analysis to compress the attitudinal data matrix of 100 items into a smaller number of independent factors. The first experiment yielded over 17 factors which contributed one percent or more to the reduction in the variance of the original matrix. Given that the objective of the analysis

TABLE 2

Factor Loadings

3 Factor Principle Components Analysis

(Orthogonal Rotation)

30% CUM VAR

Factor	Loading	Var. No.	Question
SW_a			
	.66	16p	Nothing lower than lack of respect for parents.
	.65	16j	Children should not be allowed to talk back to parents.
	.63	16n	A woman whose children are messy has failed as a mother.
	.62	16q	We will have to crack down on young people.
	.60	16o	Unusual children should be made more like others.
	.57	16i	A man's most important qualities - determination and ambition.
	.56	16k	A man should not respect a woman who had sex before marriage.
	.55	16b	Things are so complicated, I don't really understand.
	.53	19	Have you ever thought of moving?
	.51	14i	Future of the community looks bright.
	.51	16g	If children are told about sex, they will experiment.
	.49	14o	Church services are worth attending.
	.47	14f	Everyone helps decide how things should be run.
	.47	18	How do most people feel about staying here?
	.46	16m	Family is a sacred institution.
	.45	16i	It is unnatural to give women authority over men.
	.42	14v	Plenty of opportunity for people with cultural interests.
	.42	14x	High school teachers are equal to those anywhere.
SW_b			
	.61	16c	To get ahead you must do things that are not right.
	.54	14w	Chances to better one's condition are slim.
	.53	14p	Community not located in a desirable place.
	.47	16a	There is not much I can do about important problems.
	-.46	31	Happiness.
	.45	14a	Real friends are hard to find.
	.45	14s	Little hope of solving the drug problem.
	.45	25	How big a factor is air pollution in moving?

TABLE 2 (continued)

Factor	Loading	Var. No.	Question
	.43	14r	People have to do without many conveniances.
	.42	16e	Don't enjoy my work but feel I must do it.
	-.41	14m	Persons with ability are given recognition.
	-.41	14x	High school teachers are equal to those anywhere.
	-.40	14h	Moral conditions in the community are good.
SW_c	.80	17f	Status (among friends, neighbors in your community).
	.79	17e	Amount of variety/stimulation you get from life.
	.78	17h	Affluence (income, wealth, comfort in your life).
	.76	17d	Security (peace of mind, stability, freedom from threat).
	.75	17c	Freedom (of choice, expression).
	.73	17g	Sociableness (sense of friendship, participation, belonging).
	.61	17a	Health.
	.60	17b	Meaningful activity.

is not hypothesis testing but rather the construction of an index which can be meaningfully interpreted as reflecting subjective well-being, the data were reexamined using principal component analysis with the restriction that the number of factors will be limited to three.[1] The results of this analysis are presented in Table 2. Only items which have loadings greater than .4 were examined in the process of interpreting the factors. An examination of the loadings of the variables on the three factors suggests that factor SW_a is highly correlated with variables which measure degree of authoritarianism, while factor SW_b is highly correlated with variables which measure alienation and perceptions of the social environment and the community. The items loaded on factor SW_c appear to capture a dimension which may be characterized as the personal quality of life and sense of well-being.

In interpreting the loadings of the variables on the items, care must be taken to examine the items carefully. Thus, the happiness question (31) has a negative loading on factor SW_b because an examination of most of the items reveals that the higher the score on the item the greater the disagreement with what might be interpreted as a question having negative connotations. Question 31, however, is so worded as to indicate that the lower the score the happier the individual. One would expect, therefore, that the loading of item 31 would be negative on a factor which is heavily correlated with items of the former category.

It appears that both factors SW_b and SW_c contain variables which could be interpreted as pertaining to the subjective well-being of individuals, though the factors clearly capture different dimensions of this complex notion. Thus, on further analysis both factors will be used as dependent variables in the regression. Furthermore, given that the two factors appear to capture different dimensions of the notion of subjective well-being, a composite index which was designed to capture these diverse dimensions was also constructed. Two procedures were tried: the first summed the scores of factors SW_{b_2} and SW_c to form SW_d, and the second formed a product of the two factor scores.[2] The composite based on products yielded unacceptable results and, thus, was discarded.

---

[1] The decision to limit the number of factors to three was based on the consideration that the fourth factor accounted for only 4.3 percent of the reduction in variance and was difficult to interpret.

[2] These procedures were suggested by Professor Gerald Zaltman.

V.2 Estimation of Parameters

The second phase of the data analysis involved the testing of the hypothesis that variations in subjective well-being are explainable by objective, economic and demographic characteristics of the populations, and by environmental factors such as the level of pollution. Numerous variations of the functional relationships specified in the previous section were explored. On balance, Regressions I, II, III, and IV appear to have the best fit. It should be noted, however, that the results were not highly sensitive to the exact specifications either in terms of the magnitude of the coefficient of determination for cases in which the dependent variable was the same, or in terms of the statistical significance of the coefficients or the magnitude of the calculated trade-off between income and pollution. The definitions of the dependent variables are presented with each regression while the definitions of the independent variables follow in Table 3.

Given that the purpose of this investigation is to develop a methodology for measurement of the trade-off of income for pollution reduction, one can also view these regression results as a possible test for the construct validity of the indices of subjective well-being. For instance, one would require of an index of subjective well-being that, other things being equal, a person with higher income would be more content than a person with lower income, an employed person would be more content than an unemployed one and, finally, a person who rates the quality of air as very bad would be less content than one who rates it as excellent. An examination of the results indicates, we believe, that these experiments tend to add construct validity to the indices of well-being which we developed. However, the question remains as to which index appears to capture best the concept we are trying to measure.

In choosing the most appropriate index we employed two basic criteria. First, both the pollution and income variables should appear in the regression and second, given that the regressions have the same set of independent variables, the one with the highest R^2 corrected for degrees of freedom and in which the signs of the coefficients are not inconsistent with a priori expectations was chosen. In a sense the criterion is to choose the measure of subjective well-being that correlates most highly with those variables which, according to our hypothesis, affect subjective well-being. Using these criteria it would appear that factor SW_d, constructed by summing the scores of two factors derived from the principal component analysis, appears to be

Regression I[1]

Dependent Variable: SW_{31}: "In general would you say that you are very happy, pretty happy....,"

Source: Item 31

Scale: 1 - very happy; 5 - very unhappy

$$SW_{31} = .070 + \underset{(.445)}{1.203}Un + \underset{(.08)}{.139}Pol + \underset{(.243)}{.532}Crafts + \underset{(.209)}{.520}Sex$$

$$+ \underset{(.190)}{.297}Hospital + \underset{(.747)}{.864}Sep. + \underset{(.196)}{.317}Emp - \underset{(.249)}{.375}Service$$

$$- \underset{(.143)}{.132}\,Log(Income)$$

$R = .478$

$\bar{R}^2 = .150$

Variables not entered in stepwise regression:

Married, Widowed, Divorced, Occupation (Clerical, Professional), Education, Rating of Health, Race, Length of Residency.

[1] Standard errors in parentheses.

Regression II

Dependent Variables: SW_b: Alienation Index

Source: Factor SW_b, 3 Factor Principal Component Analysis

Scale: The higher the score the less alienated

$$SW_b = 2.957 - .348Pol - .499Race - .594Hospital$$
$$(.099) \quad (.210) \quad (.219)$$

$$+ .334Married + .569Services - .712Un$$
$$(.234) \quad (.285) \quad (.551)$$

$$- .319Emp. + .337Professional$$
$$(.199) \quad (.282)$$

$R = .597$

$\bar{R}^2 = .300$

Variables not entered in stepwise regression:

Widowed, Divorced, Separated, Occupation (Crafts, Clerical), Education, Income, Rating of Health, Sex, Length of Residency.

Regression III

Dependent Variable: SW_c: Personal Quality of Life Index

Source: Factor SW_c, 3 Factor Principal Component Analysis

Scale: The higher the score the higher quality of Life

$$SW_c = -.756 + \underset{(.07)}{.215}Ed - \underset{(.089)}{.278}Health - \underset{(.210)}{.319}Race$$

$$+ \underset{(.286)}{.657}Services - \underset{(.522)}{.703}Un + \underset{(.192)}{.429}Log\ (Income)$$

$$+ \underset{(.372)}{.595}Widowed + \underset{(.351)}{.582}Clerical - \underset{(.215)}{.298}Emp.$$

$$R = .579$$

$$\bar{R}^2 = .269$$

Variables not entered in stepwise regression:

Married, Divorced, Separated, Professional, Occupation (Crafts, Hospitalized), Sex, Pollution, Length of Residency.

Regression IV

Dependent Variable: $SW_d = SW_b + SW_c$

Source: 2 Factors of 3 Factor Principal Component Analysis

Scale: The higher score the higher subjective well-being

$$SW_d = 3.925 - .722\text{Race} - 1.975\text{Un} - .301\text{Health}$$
$$(.287) \quad (.687) \quad (.119)$$

$$- .372\text{Pol.} + .161\text{Ed} + 1.319\text{Services} - .696\text{Hosp.}$$
$$(.135) \quad (.098) \quad (.393) \quad (.300)$$

$$- 1.619\text{Sep.} - .750\text{Emp.} + .654\text{Prof.}$$
$$(1.199) \quad (.324) \quad (.418)$$

$$- .337\text{Sex} + .253\text{Log (Income)} + .458\text{Clerical}$$
$$(.260) \quad (.231) \quad (.462)$$

$R = .689$

$\bar{R}^2 = .395$

Variables not entered in srepwise regression:

Married, Widowed, Divorced, Occupation (Crafts), Length of Residency.

TABLE 3: Independent Variables in Regression

Name	Description	Questionnaire	Comments
Pol	Pollution Perception	23a	Scale: 1 Excellent 5 Poor
LIncome	Log Income	10a	
Race			Scale: 1 White 2 Non-white
Un	Unemployed	7b, 7c, 7d	Dummy Variables; Zero base: Retired
Emp	Employed	7b, 7c, 7d	Dummy Variables: Zero base: Retired
Crafts Services Professional Clerical	Occupation	7a	Dummy Variables; Zero base: Others
Married Separated Widowed Divorced	Marital Status	3	Dummy Variables; Zero base: Single
Sex			Scale: 1 Male 2 Female
Hosp.	Hospitalized Last Year	10c	Scale: 1 Yes 2 No
Health	Health Rating	10b	Scale: 1 Excellent 5 Poor
Ed	Education	6a	Scale: 1 Some grade school 7 Graduate Education

the best index of subjective well-being.

An examination of Regression IV would suggest that non-whites are less content than whites, unemployed are less content than employed, who are, in turn, less content than retired. Persons who rate their health as poor are less content than persons who rate their health as good or excellent. The worse the rating of the quality of the air the less content the individual. The more education an individual has the more content the respondent is. Persons employed as service workers are more content than professional persons who are more content than clerical workers. Separated persons are less content than single persons, and females are less content than males. Other things being equal, the higher the income the more content the individual. The one surprising result is that persons who were hospitalized during the previous year appeared to be more content than persons who were not hospitalized. A possible explanation for this result is that the experience in the hospital may have affected their orientation in such a way as to make them more content with their lot, other things being equal, than a person not subjected to a similar experience.

Other variables which did not enter the regression indicate that married, widowed, and divorced persons did not differ from single persons in their subjective well-being and that length of residence in Clairton had no impact on subjective well-being.

While we find the results reassuring in the sense that they increased our confidence in the derived measure of subjective well-being, the results should be viewed with caution for at least three reasons. First, the size of the sample is quite small given the number of independent variables. Second, a serious problem of collinearity among the independent variables is undoubtedly present though difficult to identify, and third, the basic structure of the hypothesis was forced into a linear format while a nonlinear format would probably have been more appropriate. These modifications must await the availability of a larger sample.

V.3 Calculation of Willingness to Pay

Based on the methodology described in Section IV.1 and the estimated parameters presented in Section V.2 we are now in a position to estimate the percent of income individuals are willing to forego in order to improve the quality of air by a given percent.

The results are calculated at the mean response of the question on the rating of the quality of air. Thus, given the regression equation:[1]

$$SW = a+\alpha \log (\text{Income}) - \beta (\text{Pol}) + \lambda X,$$

we derive

$$\frac{d\ (\text{Income})}{d\ (\text{Pollution})} = \frac{\beta}{\alpha}\ (\text{Income}),$$

and the elasticity of income with respect to pollution, given that well-being remains unchanged, is:

$$\frac{d\ (\text{Income})_{/\text{income}}}{d\ (\text{Pollution})_{/\text{pollution}}} = \frac{\beta}{\alpha}\ .\ (\text{pollution}).$$

While it was argued earlier that factor SW_d is the preferred measure of well-being, we present below the results of the estimates based on both the direct question of well-being SW_{31} and that for SW_d. The estimates for the elasticity based on the two independent factors of well-being SW_b and SW_c could not be calculated because the coefficient of the income variable was insignificantly different from zero in the second regression while the coefficient of the pollution variable is insignificantly different from zero in the third regression.

This elasticity concept has, however, some serious analytical difficulties because of the arbitrariness of the pollution scale. Envision, for example, the following two-part experiment: The first part involves the questionnaire as presented in this investigation; the second utilizes the same questionnaire except that the question regarding the quality of air has a scale of from 5 to 10 or from -2 to +2. If the data were analyzed using identical statistical regression models the results would be identical, except for the intercept, because it can be demonstrated that the estimated coefficients would be independent of the addition or subtraction of a constant from each observation of the independent variable, which is what we would be doing if we adopted

[1] X is the vector of all other independent variables assumed to remain constant.

either one of the alternative scales. However, our measure of elasticity, which involves the actual value of the independent variable, is directly determined by the scale that we adopt which, as stated, is rather arbitrary. The difficulty is apparent when one considers that an improvement in the quality of air from 10 to 9 represents a 10 percent improvement; however, an improvement from 5 to 4 which should represent an equal improvement given the arbitrariness of the origin represents a 20 percent improvement. This issue is troublesome. It should be noted, however, that this problem in index construction would be present even if the pollution data represented objective data. In that case, the question would be whether the origin should be the quality of air in a laboratory or in Yellowstone National Park. There appear to be two ways of resolving this dilemma. One involves the continued use of the notion of elasticity, recognizing its inherent characteristics and using a scale which appears "natural." It would seem that an origin of zero is more natural than an origin of unity and given that the mean value of the pollution variable is 4.3 and since it can be readily demonstrated that a transformation of the scale from 1 to 5 to one spanning the range of zero to four will result in a mean of 3.3, this mean will be used for calculating the elasticities. Using this value, the corresponding elasticity derived from the regression with SW_{31} as the dependent variable is 3.47 while that derived from the regression with SW_d as the dependent variable is 4.85. The interpretation of the first estimate is that an individual would be willing to forego 3.47 percent reduction in income for a one percent reduction in perceived pollution.

A second resolution of the dilemma is to reject the notion of elasticity altogether as a useful construct for communicating these results and simply, for instance, state that based on results obtained using SW_d as dependent variable, an individual with income of $20,000 would be willing to forego $220 if measures were taken to reduce pollution so that his assessment of the quality of air would improve by .01.

These estimates are substantially larger than we had anticipated. Our expectations, which admittedly were not founded on any prior hard evidence, were that the elasticity would be significantly less than unity. It is quite possible that this high elasticity results from our being forced, because of sampling cost considerations, to limit our sample to only one community and, therefore, to use assessment of the quality of air rather than actual measurements as the independent variable in our regression. The use of actual measurement would probably have resulted in a smaller coefficient

for the pollution variable and, therefore, in smaller elasticities.[1]

[1]Given that the index of subjective well-being is also affected by personality attributes which were omitted from the analysis, it is likely that these missing variables are correlated with the variable describing the assessment of the quality of air. If this is the case, the estimate of the coefficient of this variable will be biased.

In an attempt to test this hypothesis we reestimated the equation represented by Regression IV with the addition of a variable likely to capture at least some personality characteristics and one which is highly correlated with the dependent variable. The results were as expected. The explanatory power of the equation increased substantially and the elasticity coefficient calculated from this equation was smaller than those cited above. Thus, this result supports the hypothesis about the source of the bias. It must be noted, though, that the estimated coefficients was still highly elastic.

VI. THE QUESTIONNAIRE

UNIVERSITY OF PITTSBURGH

Graduate School of Business

Community Study Questionnaire

Interviewer's name_____ Interview #_____(1-3)

Card # 1 (4)

Respondent is White_____1 Non-white_____2 (5)

Male_____1 Female_____2 (6)

---

1. How old are you? (WRITE AGE IN YEARS.) _____(7-8)

2a. How long have you lived at this address? (WRITE NUMBER OF YEARS.) _____(9-10)

2b. Where did you last live? (WRITE NAME OF TOWN, STATE, COUNTRY. IF IN PITTSBURGH, WRITE NAME OF COMMUNITY.) _____

---

(11)

___1 Same community, different address

___2 Same state, different area

___3 Different state

___4 Outside U.S.

(12)

___1 NE

___2 Mid-Atlantic

___3 S

___4 Mid-West

___5 SW

___6 W

___7 NW

(13)

___1 LA

___2 NE Eur

___3 E & SE Eur

___4 E Med-N Africa

___5 Africa

___6 Asia

___7 Other

3. What is your marital status? (14)

Single___1 Married___2 Widowed___3 Divorced___4 Separated___5

4a. Could you tell me all the members of your household, that is, all the people who live with you?

	Age	M-1	F-2
Spouse	____(15-16)	____	____(17)
Father	____(18-19)	____	____(20)
Mother	____(21-22)	____	____(23)
Child	____(24-25)	____	____(26)
Child	____(27-28)	____	____(29)
Child	____(30-31)	____	____(32)
Child	____(33-34)	____	____(35)
Others:			
_____	____(36-37)	____	____(38)
_____	____(39-40)	____	____(41)
_____	____(42-43)	____	____(44)
_____	____(45-46)	____	____(47)

4b. Do you have any children who live away from home? (48) Yes____1 No____2

4c. (IF YES) Where do they live? (49)
In the same town or nearby. ____1
In a different town far away. ____2

4d. What are their ages and sex?

	Age	M-1	F-2
1.	____(50-51)	____	____(52)
2.	____(53-54)	____	____(55)
3.	____(56-57)	____	____(58)
4.	____(59-60)	____	____(61)
5.	____(62-63)	____	____(64)

5a. Do other members of your family--relatives--live nearby? (65)
Yes____1 No____2

5b. (IF YES) In the same town? _____1 (66)
In a nearby town? _____2

6a. How much education have you had? (67)

Some grade school ___1
Finished grade school ___2
Some high school ___3
Finished high school ___4
Some college ___5
College graduate ___6
Graduate education ___7

Name of degree (68)
___1 BA
___2 BS
___3 MA
___4 Ph.D.
___5 Other

6b. Have you had any vocational or technical training? (69)

Yes ___1 No___2

Interview # _____(1-3)
Card # 2 (4)

7a. What is your occupation? (WRITE ANSWER BELOW. INCLUDE STUDENT, HOUSEWIFE) (5-6)

_____
_____
_____

___1 Professional
___2 Manager or administrator
___3 Sales worker
___4 Clerical worker
___5 Craftsman, foreman
___6 Operative
___7 Transport equipment operative
___8 Laborer
___9 Service worker
___10 Private household worker
___11 Housewife
___12 Student

7b. Are you retired? (7) Yes___1 No___2

7c. Are you employed? (8) Yes___1 No___2 (IF NO, SKIP TO Q. 8)

7d. Do you work full time ___1 or part-time___2 (9)

7e. Employer (IF U.S. STEEL, SPECIFY CLAIRTON WORKS, IRVIN WORKS, ETC.) (10-11)

_____

_____

8a. (IF RESPONDENT IS FEMALE AND MARRIED) What is your husband's occupation? (12-13)

_____
_____
_____

___1 Professional
___2 Manager or administrator
___3 Sales worker
___4 Clerical worker
___5 Craftsman, foreman
___6 Operative
___7 Transport equipment operative
___8 Laborer
___9 Service worker
___10 Private household worker
___11 Housewife
___12 Student

8b. Is he retired? (14) Yes___1 No___2

8c. Is he employed? (15) Yes___1 No___2 (IF NO, SKIP TO Q. 9a.)

8d. Does he work full time___1 or part-time___2 (16)

8e. Employer (IF U.S. STEEL, SPECIFY CLAIRTON WORKS, IRVIN WORKS, ETC.) (17-18)

_____
_____

9a. Are there any other people in the household who work? (19)

Yes___1 No___2 (IF NO, SKIP TO Q. 10)

	Full-time 1	Part-time 2	Employer
9b. Wife (ASK OF MALES ONLY)	_____	_____ (20)	_____(21-22)
Child	_____	_____ (23)	_____(24-25)
Parent	_____	_____ (26)	_____(27-28)
Other	_____	_____ (29)	_____(30-31)

10a. What is your present annual household income? (INCLUDE CONTRIBUTIONS FROM ALL MEMBERS OF HOUSEHOLD -- SOCIAL SECURITY, PENSIONS, ETC.) (32-33)

___01 - Under 1,000
___02 - 1,000 - 1,999
___03 - 2,000 - 2,999
___04 - 3,000 - 3,999
___05 - 4,000 - 4,999
___06 - 5,000 - 5,999
___07 - 6,000 - 6,999
___08 - 7,000 - 7,999
___09 - 8,000 - 8,999
___10 - 9,000 - 9,999
___11 - 10,000 - 10,999
___12 - 11,000 - 11,999
___13 - 12,000 - 12,999
___14 - 13,000 - 13,999
___15 - 14,000 - 14,999
___16 - 15,000 - 17,499
___17 - 17,500 - 19,999
___18 - 20,000 - 22,499
___19 - 22,500 - 24,999
___20 - 25,000 - 29,999
___21 - 30,000 - 49,999
___22 - 50,000 - more
Between _____ and _____

10b. As compared to other people of your age, how would you rate your health? Please choose one. (34)

_____1 Excellent _____3 Average _____5 Poor
_____2 Better than average _____4 Below average

10c. Have you been hospitalized during the past year? (35)

Yes ___1 No___2 (IF NO, SKIP TO Q. 10e)

10d. (IF YES) Could you tell me briefly what it was for? (36-37)

_____

_____

_____

10e. Have you had any illnesses or health problems during the past year? (38)

Yes _____1 No_____2 (IF NO, SKIP TO Q. 11a)

10f. (IF YES) Could you please describe each of them and tell me if you were treated for them by a doctor? (PROBE FOR ASTHMA, ALLERGIES, RESPIRATORY INFECTIONS, CHRONIC COUGHS, EMPHYSEMA, HEART CONDITION. LIST EACH SEPARATELY. CHECK IF TREATED BY A PHYSICIAN.)

Illness	Treated by physician
_____(39-40)	_____(41)
_____(42-43)	_____(44)
_____(45-46)	_____(47)
_____(48-49)	_____(50)
_____(51-52)	_____(53)

11a. (FOR RESPONDENTS WHO WORK) Which of the following best describes your feelings about your job? (54)

___1 It's a fine job and I'm happy with it.

___2 It's a pretty good job, and they treat me fairly well.

___3 It's like all jobs, sometimes good and sometimes bad.

___4 It's not a very satisfactory job.

___5 It's a lousy job and I am unhappy with it.

11b. (FOR RESPONDENTS WHOSE SPOUSES WORK.) How does your husband/wife feel about his/her job? (55)

___1 It's a fine job and he/she is happy with it.

___2 It's a pretty good job and they treat him/her fairly well.

___3 It's like all jobs, sometimes good and sometimes bad.

___4 It's not a very satisfactory job.

___5 It's a lousy job and he/she is unhappy with it.

12. What clubs and/or organizations do you belong to? (Do you consider yourself an active member?)

	Belong To 1	Active Member 2	Hold an Office 3
a. Church (56)	___	___	___
b. Fraternal Organization (57) (Elks, Rotary)	___	___	___
c. Political Organization (58) (party, committee)	___	___	___
d. Nationality Organization (59)	___	___	___
e. Civic Organization (60)	___	___	___
f. Environmental Organization (61)	___	___	___
g. Parents' Organization (62)	___	___	___
h. Credit Organization (63)	___	___	___
i. Sport Organization (64)	___	___	___
j. Union (65)	___	___	___
k. Other (66-67)	___	___	___

Interview # _____
Card # 2

13a. Taking things all together, how would you say things are these days--would you say you are very happy, pretty happy, or not too happy these days?

___1 Happy ___2 Pretty happy ___3 Not Too Happy (68)

13b. Compared with your life today, how were things four or five years ago--were things happier for you then, not quite as happy, or what?

___1 Happier for me then ___2 Not quite as happy

___3 Other_____(69-70)

Interview # _____(1-3)
Card # 3 (4)

14. (HAND RESPONDENT CARD 1) I am going to show you some statements and for each of them I'd like you to tell me the degree to which it applies to your community. For each statement you can indicate that you Strongly Agree, Agree, Are Uncertain, Strongly Disagree with it as a statement about your town.

		SA 1	A 2	U 3	D 4	SD 5
a.	Real friends are hard to find. (5)	__	__	__	__	__
b.	It is difficult for the people to get together on anything. (6)	__	__	__	__	__
c.	Almost everyone is polite & courteous. (7)	__	__	__	__	__
d.	A good many go in for half-baked ideas. (8)	__	__	__	__	__
e.	The people as a whole mind their own business. (9)	__	__	__	__	__
f.	Everyone helps decide how things should be run. (10)	__	__	__	__	__
g.	Almost everyone is ready and willing to work. (11)	__	__	__	__	__
h.	Moral conditions in the community are good. (12)	__	__	__	__	__
i.	The future of the community looks bright. (13)	__	__	__	__	__
j.	No one seems to care how the community looks. (14)	__	__	__	__	__
k.	The community may well be proud of its churches. (15)	__	__	__	__	__
l.	It will never seem like home to me. (16)	__	__	__	__	__
m.	Persons with real ability are given recognition. (17)	__	__	__	__	__
n.	Not much can be said in favor of a place this size. (18)	__	__	__	__	__
o.	The church services as a rule are well worth attending. (19)	__	__	__	__	__

		SA 1	A 2	U 3	D 4	SD 5
p.	The community is not located in a very desirable place.	(20)__				
q.	A person has to leave town in order to have a good time.	(21)				
r.	The people have to do without a good many conveniences.	(22)				
s.	There is little or no hope of solving the drug problem.	(23)				
t.	There are not many families you would care to marry into.	(24)				
u.	People have to do without adequate shopping facilities.	(25)				
v.	There's plenty of opportunity for people with cultural interests.	(26)				
w.	The chances for a person to better his condition are pretty slim.	(27)				
x.	The high school teachers in the community are equal to teachers anywhere.	(28)				
y.	The doctors in the community are well-trained and competent.	(29)				
z.	A person who is having a tough time is not likely to receive much help.	(30)				

(TAKE BACK CARD 1)

15. (HAND RESPONDENT CARD 2) Science has made many changes in the way people live today as compared with the way they lived 50 years ago. On the whole, do you think people are happier now than they were 50 years ago because of those changes, or not as happy? (31-32)

____1 Happier
____2 Not as happy
____3 No difference
____4 No opinion
____5 Happier in some ways, unhappier in others
____ Other_____

(TAKE BACK CARD 2)

16. (HAND RESPONDENT CARD 3) I am going to read you some opinions on the state of the world. I'd like you to tell me for each of them, as before, whether you Strongly Agree, Agree, Are Uncertain, Disagree, or Strongly Disagree with the statement.

		SA 1	A 2	U 3	D 4	SD 5
a.	There is not much that I can do about most of the important problems that we face today.	(33)__				
b.	Things have become so complicated in the world today that I really don't understand what is going on.	(34)__				

		SA 1	A 2	U 3	D 4	SD 5
c.	In order to get ahead in the world today, you are almost forced to do some things which are not right.	(35)__	—	—	—	—
d.	I am not much interested in the TV programs, movies or magazines that most people seem to like.	(36)__	—	—	—	—
e.	I don't really enjoy most of the work I do, but I feel that I must do it in order to have other things I need and want.	(37)__	—	—	—	—
f.	Some equality in marriage is a good thing, but by-and-large, the husband ought to have the main say-so in family matters.	(38)__	—	—	—	—
g.	If children are told much about sex, they are likely to go too far in experimenting with it.	(39)__	—	—	—	—
h.	Women who want to remove the word 'obey' from the marriage service don't understand what it means to be a wife.	(40)__	—	—	—	—
i.	The most important qualities of a real man are determination and driving ambition.	(41)__	—	—	—	—
j.	A child should never be allowed to talk back to his parents or else he will lose respect for them.	(42)__	—	—	—	—
k.	A man should not be expected to have respect for a woman if she had sexual relations before they are married.	(43)__	—	—	—	—
l.	It is somehow unnatural to place women in positions of authority over men.	(44)__	—	—	—	—
m.	The family is a sacred institution, divinely ordained.	(45)__	—	—	—	—
n.	A woman whose children are at all messy or rowdy has failed in her duties a mother.	(46)__	—	—	—	—
o.	If a child is unusual in any way, his parents should get him to be more like other children.	(47)__	—	—	—	—
p.	There is hardly anything lower than a person who does not feel a great love, gratitude, and respect for his parents.	(48)__	—	—	—	—
q.	The facts on crime and sexual immorality show that we will have to crack down on young people if we are going to save our moral standards.	(49)__	—	—	—	—

(TAKE BACK CARD 3)

17. This question is going to be a little different from the others. I'd like you to think about the different aspects of your life, and imagine that you are rating yourself on a scale from zero to one hundred. Just give a number showing how you would rate yourself if zero were the worst possible circumstances and one hundred the best. (HAND RESPONDENT CARD 4) To make things a little easier, for each of those words you'll find some explanatory words in parenthesis to tell you what we mean. For example, after 'health' you'll see 'your general well-being, longevity, survival.' Those are the things we want you to consider when you think about health.

	Now	In 10 years
a. Health (your general well-being, longevity, survival)	___(5-6)	___(23-24)
b. Meaningful activity (a sense of accomplishment about what you do)	___(7-8)	___(25-26)
c. Freedom (freedom of choice, of expression, time to do the things you want)	___(9-10)	___(27-28)
d. Security (peace of mind, freedom from threat, stability)	___(11-12)	___(29-30)
e. Novelty (the amount of variety or stimulation you get from life)	___(13-14)	___(31-32)
f. Status (your social standing, respect, or power among your friends and neighbors, in your community)	___(15-16)	___(33-34)
g. Sociableness (a sense of friendship, participation, or belonging)	___(17-18)	___(35-36)
h. Affluence (the amount of income, comfort, wealth, or 'good things' in your life)	___(19-20)	___(37-38)
i. Aggression (feelings of anger, frustration, competition)	___(21-22)	___(39-40)

Now I'd like you to go through the list again and indicate how you think things will be for you ten years from now.

(TAKE BACK CARD 4. COMPREHENSION GOOD_____ POOR_____)

18a. Which of the following would you say best describes how most people feel about this community? (41)

___1 They like it very much.

___2 They are pretty satisfied.

___3 They don't care one way or the other.

___4 They aren't too satisfied.

___5 They don't like it at all.

18b. How do most people feel about staying here? (42)

___1 They definitely intend to stay here.

___2 They'll probably stay.

___3 They don't know.

___4 They are thinking of moving.

___5 They definitely would like to move.

19. Have you ever given any thought to the possibility of moving from this community? (43)

___1 It never even crossed my mind.

___2 I've thought about it, but never seriously.

___3 I've thought about it, but I have too many ties here.

___4 I'm thinking about it very seriously.

___5 I definitely intend to move at the first opportunity.

20. (HAND RESPONDENT CARD 5) The following is a list of phrases which describe how many people in this community might feel about those who have moved away. Please tell me as many as you think describe most people's attitudes. (PLACE A 1 OPPOSITE RESPONDENT'S CHOICES.)

a. Everyone has a right to make their own decisions. (44)___

b. People who leave are giving this town a bad name. (45)___

c. People should stay and help us correct what's bad about the community. (46)___

d. People who are moving away are turning this community over to the worst elements. (47)___

e. People move to improve themselves. (48)___

f. People who don't live in this community shouldn't continue to take money out of it. (49)___

g. I wish I could move, too. (50)___

h. They're lucky to be getting out of here. (51)___

i. Other _____ (52-53)___

(TAKE BACK CARD 5)

21. (HAND RESPONDENT CARD 6) Here's a list of problems most communities have. Please read with me through the entire list and then tell me the five most important problems in your town. (PLACE A 1 OPPOSITE RESPONDENT'S CHOICES. DO NOT INSIST ON EXACTLY 5)

a.	Not enough jobs	(54)___
b.	Decline in population	(55)___
c.	Drug usage	(56)___
d.	Lack of respect for authority	(57)___
e.	Lack of recreational facilities	(58)___
f.	Urban decay	(59)___
g.	Poor schools	(60)___
h.	Lack of medical facilities	(61)___
i.	Political corruption	(62)___
j.	Inadequate town services	(63)___
k.	Racial strife	(64)___
l.	Pollution	(65)___
m.	People on welfare	(66)___
n.	Weather	(67)___
o.	Other _____	(68-69)___

(TAKE BACK CARD 6)

Interview # _____(1-3)
Card # 5 (4)

22. When you hear people say critical things about your community, which of these statements describes how you feel? (HAND RESPONDENT CARD 7) Choose as many as you wish. (PLACE A 1 OPPOSITE RESPONDENT'S CHOICES.)

a.	People are too ready to be critical.	(5)___
b.	Those people don't know all the facts	(6)___
c.	Why don't they talk instead about the good things.	(7)___
d.	They're just out for publicity.	(8)___
e.	It's easy to criticize when you don't have to live here.	(9)___
f.	Even if they're right, their criticism is unfair because we're trying to do something about it.	(10)___
g.	Criticism is really an attack on me.	(11)___
h.	I really think they're right, but if I agree I might lose my job.	(12)___
i.	Things are no better anywhere else.	(13)___
j.	Other people are out to get us.	(14)___
k.	None of the above.	(15)___
l.	Other _____ _____	(16-17)___

(TAKE BACK CARD 7)

23a. Overall, how would you rate the quality of the air in this community? (18)

____1 Excellent ____3 Average ____5 Poor
____2 Above average ____4 Below average

23b. Overall, how would you rate the quality of the water? (19)

____1 Excellent ____3 Average ____5 Poor
____2 Above average ____4 Below average

24a. To what degree are you concerned over the condition of the air in your community? (20)

____1 Extremely concerned ____3 Does not concern me one way or the other ____4 Rather concerned
____2 Somewhat concerned ____5 Not at all concerned.

24b. To what degree are you concerned over the condition of the water in your community? (21)

____1 Extremely concerned ____3 Does not concern me one way or the other ____4 Rather concerned
____2 Somewhat concerned ____5 Not at all concerned.

25. During the past few years, according to census figures, a lot of people have moved from this community and some have moved, they say, because of pollution. How big a factor do you think air pollution is in people's decision to move? Would you say that: (22)

____1 It is the most important factor.
____2 It is <u>one</u> of the most important factors.
____3 It is just one of the things that might induce a person to move.
____4 It is not an important factor.
____5 It is definitely not a factor.

26. Choose as many of the following as you feel apply. "The industries in this area are:" (PLACE A 1 OPPOSITE RESPONDENT'S CHOICES.)

a. Doing everything they can to clean up pollution. (23)____
b. Understandably trying to keep their profits up while also reducing pollution. (24)____
c. Trying to keep the plants open rather than shut down to meet unreasonable anti-pollution regulations. (25)____
d. Using the threat of closing down as a way to avoid spending money to install pollution abatement equipment. (26)____

27. Suppose that the local industries and the community decided to go on an all-out campaign to clean up air pollution around here. Which of the following would you expect to be the most immediate effects of this action? Please choose three. (27-28-29)

____1 Real estate values would go up.

____2 People would stop being so unfriendly.

____3 The factories would shut down and lots of people would be out of work.

____4 People would start moving back into the community.

____5 People would start fixing up their stores and homes.

____6 None of these.

____ Other_____(30-31)

28. Do you think air pollution in this area makes housekeeping: (32)

____1 Much easier on housewives

____2 Easier on housewives

____3 No different from other areas

____4 Harder on housewives

____5 Much harder on housewives

29a. Do you ever take a drink (beer, whiskey, or other alcoholic drink)? (33)

____1 Yes ____2 No (IF NO, SKIP TO Q. 30)

29b. Did you take a drink last week? (34)

____1 Yes ____2 No (IF NO, ASK Q. 29d, THEN SKIP TO Q. 30)

29c. About how many times did you take a drink during the past week? (35)

____1 Once or twice

____2 3 or 4 times

____3 Nearly every day

____4 Once a day

____5 2 times a day

____6 3 or more times a day (SPECIFY)

29d. Is that more or less often than usual? (36)

____1 Less ____2 Same ____3 More

29e. During the past week, was there any time (or times) when you got high (got so you were feeling no pain)? (37)

____1 Yes ____2 No

29f. How often do you drink (alcoholic beverages) at:

		Almost Never 1	Once in a while 2	Fairly Often 3	Often 4
Your home?	(38)	_____	_____	_____	_____
Friends' home?	(39)	_____	_____	_____	_____
Restaurants, bars, clubs?	(40)	_____	_____	_____	_____

30. About how many hours a day, on the average, did you watch TV last week? (41)

____0 None
____1 One hour or less
____2 Two hours a day
____3 Three hours a day
____4 Four hours a day
____5 Five hours a day
____6 More than five hours a day

31. This may seem repetitious to you, but I'd like to ask you again whether in general you would say that you are very happy, pretty happy, not too happy, rather unhappy, or very unhappy these days. (42)

____1 Very happy
____2 Pretty happy
____3 Not too happy
____4 Rather unhappy
____5 Very unhappy

That's all. Thank you very much.

APPENDIX A

LITERATURE REVIEW[1]

This appendix contains a review of the literature that served as the basis for our study. It can be classified into 3 major categories: (a) attempts to measure the direct costs of the deterioration caused by air pollution, particularly on property and human health; (b) surveys that attempt to measure the psychic costs of air pollution and estimate willingness to pay for pollution abatement; and (c) efforts at constructing indicies of personal satisfaction and assessment of the quality of life in a community. This literature review follows this broad classification scheme, focusing on the unique methodological features of the various studies and on their primary findings.

Measurement of Direct Costs

The material effects of air pollution have been extensively researched in recent years. The damage that can be inflicted on vegetation, building materials, paint, metals, fabrics, etc., especially by the oxides of sulphur and nitrogen not only is documented in scientific papers but has been publicized in more popular journals and pamphlets (e.g. 35).[2] The following studies seek to assign a dollar value to this damage.

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[1] Sections of this chapter are adapted from Richard Wokutch, "A Review of Methodologies Attempting to Measure the Benefits of Air Pollution Reduction," University of Pittsburgh, Graduate School of Business, 21 February 1974.

[2] Numbers in parentheses refer to items listed in the accompanying bibliography.

Crop Damage

Studies of crop damage have established a relationship between agricultural losses and air pollution. The Public Health Service of the Department of Health, Education and Welfare has reviewed a number of studies that measure the effect of various pollutants on plant life (45). Damage to crops can be determined experimentally by keeping all other factors constant (e.g., soil, water, climate) and allowing pollution level or quality to vary. Alternatively, statistical studies can be conducted in which crop yields over a wide area are surveyed and the contribution of various factors, including pollution, calculated. One study conservatively estimated that air pollution caused damage worth $44 million to California crops in 1969 (17). A related group of studies has investigated the economic effects of pollution on domestic animals by projecting experimental results to estimate total dollar damages (44).

Materials and Property Damage

One approach of studies in this area has been to conduct engineering experiments on materials to determine deterioration effects. These results can then be used in conjunction with the amounts of the various materials in the sample under study to estimate a total dollar damage figure. Another approach has been to use empirical data on maintenance and replacement costs of various physical structures to determine the effects of pollution. One such study, reported by Ridker (38), examined the relationship between frequency of repainting electrical transmission towers in

St. Louis and detailed measurements of air pollution in St. Louis. In this, as in other industrial and commercial studies, the findings were inconclusive. Ridker concludes that "air pollution undoubtedly makes a difference . . . but . . . there is not enough information to say exactly what the difference is" (p. 72).

Two further studies used household questionnaires to ascertain how much more was spent on maintaining home and personal cleanliness in heavily polluted areas. A survey conducted in Philadelphia, covering such topics as frequency of exterior and interior painting, time spent in routine cleaning, frequency of dry-cleaning garments or of washing cars, expenditures on cleaning and laundering supplies, yielded poor results. Interestingly, it was willingness to pay and attitude questions which distinguished low from high pollution areas. In the dirtier neighborhood, 15% voluntarily mentioned odors or soot as disadvantages, while only 2% did so in the cleaner area. Similarly 23% in the high pollution area wanted more tax dollars spent on pollution control as against 20% in the low pollution area (38).

A similar study compared two communities, Steubenville and Uniontown, Pa., which differ widely in level of air pollution, Steubenville being the more polluted. Frequency data for a variety of cleaning and maintenance activities were obtained by mail questionnaire, then converted into dollar values based on local market prices. The authors estimate the per capita cost of living in the more polluted city at $84 (31).

The validity of these studies is open to question, first because actual behavior may differ from perceived behavior as reported on a questionnaire, and secondly because the underlying assumption, that there is a standard level of cleanliness to which all householders aspire, may be false. It seems likely, and this is supported by data on industrial maintenance, that individuals adapt to some extent and simply endure the greater unsightliness caused by high pollution.

Real Estate Studies

A number of studies have been conducted which use the effect of air pollution on property values as a measure of the total effect of air

pollution. Ridker and Henning (39) compared cross section census tract data on housing characteristics in St. Louis with measured pollution levels. They constructed a multiple regression model to examine the effect on housing values of such variables as median number of rooms, commuting time to the central business district, percentage of houses recently built, houses per mile, etc., in addition to pollution levels measured by an index for the annual geometric mean sulfation level. They concluded that a .25mg of $SO_3/100cm^2/day$ decrease in pollution would result in a rise of between $83 and $245, with the rise likely to be in the higher range. Using the $245 figure and assuming a .25mg reduction in pollution, the authors estimated that property values would rise by $82,790,000.

This study provoked a discussion of several methodological problems. Ridker (37), elaborating on the problem of cross section data, suggests that while examining the differences in value between housing in high and low pollution areas, there is no way to determine how much of the difference can be attributed to the rise in value of housing in less polluted areas rather than the decline of housing values in highly polluted areas. While the appropriate value to be measured is the net decline in housing value, it is difficult to evaluate. Moreover, due to the use of cross section data at a point in time, one cannot be sure the values derived are equilibrium values. Further difficulties arise because the effects of pollution that are viewed as disbenefits will likely depend on the particular class of buyers and sellers involved. To minimize this difficulty, Ridker suggests looking separately at residential, commercial, and industrial property.

Anderson and Crocker (1) conducted a study of the benefits of air pollution reduction in St. Louis, Kansas City, and Washington, D.C. using a similar method but including median family income as an independent variable. They argue that income is a variable within the sample and significantly aids in the explanation of property values. Cautioning the reader about the difficulty of measuring a complex phenomenon such as "air pollution," they report that the three cities show a $300-$700 change in property values associated with a change of $10mg/m^3$ per day in suspended particulates and a .1mg $SO_3/100cm^2/day$ in sulfation levels.

Further criticism of this methodology is offered by Freeman (18) who contends that cross section studies contribute little in the absence of a general equilibrium model of land rents which takes into account the pattern of air quality in the areas. Hite et al. (19) argue that technical measurement of air quality may not coincide with the layman's more subjective judgment; that such models ignore the added costs of living in nonpolluted suburban areas (e.g., commuting time and cost); that the model does not apply to areas where sites with good environmental quality are abundant, as shown by Steele (43) in a study of Charleston, S.C.; and that the methodology measures only site-specific demands for air quality.

Despite these limitations and problems, real estate studies have potential use in the measurement of air pollution effects. The current studies using this methodology give estimates which probably represent fairly well the magnitude of these effects, but more confidence could be placed in this approach if comparable results using cross section data could be achieved with time-series data in the same cities.

Health

Three methods have been used to determine the effects of air pollution on human health: projection of laboratory findings; statistical analysis to determine the relationship between pollution levels and selected health data such as the incidence of certain diseases or the rate of morbidity and mortality; and case studies of health effects produced by episodes of unusually high pollution.

Chambers (6) cites experiments in which laboratory animals were exposed to Los Angeles air, resulting in marginal but significant biological effects. Animals that were first subjected to stress (electric shock) were more susceptible to smog. While such experiments can demonstrate the detrimental effects of air pollution, they cannot provide estimates of the degree to which it affects human health when many other factors must be considered.

Lave (27) and Lave and Seskin (28, 29), have contributed a number of important papers which use statistical techniques to assess the relationship

between health and air pollution. Evaluating a number of previous investigations, they conclude that, despite many methodological difficulties, "there is an important association between air pollution and various morbidity and mortality rates" (28: p. 729). They proceed to estimate the health cost of air pollution in terms of forgone income and current medical expenditures, estimating that a 50% reduction in air pollution would lower the economic costs of morbidity and mortality by 4.5% in major urban areas. In subsequent papers, Lave and Seskin examine the relationship between air pollution and mortality in 117 SMSAs using 1960 data. Socioeconomic factors are accounted for, and occupation mix, resulting in little change in the estimated air pollution coefficients.

The third method involves looking at change in morbidity and mortality rates associated with a dramatic rise in pollution levels such as the episodes in Donora, Pa., 1948, the Meuse Valley of Belgium, 1930, and London, 1952 and 1962. In each case, deaths and illnesses increased sharply: London in 1952 reported an increase of over 4000 deaths in a two-week period (25). The problems with estimating the health effects of pollution through this method are threefold. First, those who die tend to be old and sickly anyway, so it is difficult to determine how much longer they otherwise could be expected to live. Secondly, morbidity rates as measured by employee absenteeism is suspected to be highly interrelated with other factors (e.g., high absence rates on Fridays and seasonal variations in absence rates) and therefore of questionable worth. And finally, it is a questionable procedure to project conclusions drawn from this sample consisting of high pollution level observations to pollution levels which are encountered more frequently.

Attitude Surveys

Public opinion polls, or questionnaire surveys, have been used in some instances to estimate costs of air pollution and/or the public's willingness to pay for pollution control. The major goal of such studies, however, has been to ascertain the extent to which people are bothered

by air pollution, frequently measuring the salience of pollution against other common community or national concerns.

Awareness and Concern

Nationally, public opinion polls have revealed a growing concern over pollution since 1965 when questions on this topic were first asked. In 1965, only about one person in ten considered pollution a very serious problem but by 1971 most people did so. By 1970, the issue of conservation was appearing on volunteered lists of important national problems (16).

Studies conducted in specific locations reveal an awareness level ranging from about 40% to 80% and above. One of the earliest (1959) and largest of the surveys (2835 respondents) was conducted in Nashville, Tenn., as part of a public health study (42). Only 2.5% mentioned air pollution as a health condition in the city that needed to be improved, and 3.8% that air pollution made Nashville an unhealthy place to live. When asked if they were bothered specifically by smog, 23% replied affirmatively, citing property damage (10.1%), respiratory problems (5.8%), and various other reasons. In surveys where air pollution is not defined exclusively as smog, the percentage of persons bothered is generally higher. In Buffalo, N.Y., air pollution was considered to be a serious community problem by 43.6% in 1959 and 45.5% in 1962 (13). Air pollution was considered to be present at some time during the year by 79% of a sample of 104 in Clarkston, Washington, 1961-62 (30). Respondents identified air pollution as an odor problem (91%), a problem in visibility (74%), nose or throat irritation (62%), eye irritation (40%), dustfall (27%). Although 85% found Clarkston an excellent or good place to live, one-third spontaneously mentioned a disadvantage explicitly related to air pollution, and 72% regarded air pollution as a serious or somewhat serious problem for the community.

In St. Louis, 1002 persons living in the St. Louis metropolitan area were interviewed in 1962 (40). A substantial number indicated some dissatisfaction with the quality of the air, defining air pollution primarily as smoke, exhaust gases, odor, dust and dirt. About one-half of the respondents said they were bothered "somewhat" or "quite a bit" by air pollution.

Levels of awareness and concern appear to be even higher in more recent surveys, due at least in part to extensive national publicity to environmental problems. In a sample of 96 residents of a small Utah community, 82% were aware of air pollution at some time during the year, and over one-half were highly bothered by it (7). In Indianapolis, 1971, 73% said air pollution was serious in the area, and 50% expressed concern about neighborhood air pollution (36). Definitions, as in the Clarkston study, were dust and dirt in the air (39%), nose and throat irritation (22%), bad smells (20%), fog and haze (18%), eye irritation (15%). Only 8%, however, spontaneously mentioned air pollution as a feature they disliked about Indianapolis. In a study in Durham, N.C., 62% considered air pollution a moderate or serious problem (33).

Surveys in the Los Angeles area reveal particularly high levels of awareness and concern. In Pasadena, 1968, 90% had been bothered by air pollution, 93% said there was air pollution in their neighborhood, and 67.9% considered air pollution a very serious problem (41). In 1972, 75% of persons interviewed in the Los Angeles area were seriously disturbed by air pollution, citing depression and physical irritation. About 40% spontaneously mentioned smog as Los Angeles' most important problem (22).

Salience

The salience of air pollution as a problem is shown in those studies asking either for a spontaneous list of community problems or offering a list of common problems for the respondent to rank. Generally, air pollution ranks behind such problems as unemployment, juvenile delinquency, or lack of recreational facilities. In one St. Louis community, however, air pollution ranked ahead of these problems (40), and in Pasadena 67.9% ranked air pollution ahead of recreation, unemployment rate, city taxes, and juvenile delinquency (41). One Los Angeles study found a class/race difference in salience: middle and upper class respondents considered air pollution the primary problem for the area; blacks and Mexican-Americans viewed race, poverty, police harrassment, and inadequacy of schools as more pressing; and the working class and poor worried most about crime and delinquency (22).

Socioeconomic Variables

Correlation of the awareness and concern responses with socioeconomic variables gives varying results. In Nashville, females were apparently more bothered by air pollution than males (42), but the Clarkston, Johnstown, and Indianapolis studies found no sex difference in degree of concern expressed (30, 8, 36). In Alabama, a state-wide survey found no significant differences between men and women in rating the quality of air or water or in their concern over pollution (15). In Johnstown, no relationship was found between occupation and awareness whereas the Clarkston data showed that concern rose with the occupational level of the head of household. In Indianapolis, the significant variables were age and education: persons 18-25 were more aware of air pollution than were persons 55 or over; and college graduates were more aware than those with less education. Similarly in Alabama, the higher the educational level, the greater the concern expressed over the condition of the environment (15). Degroot contends that the seriousness with which air pollution is viewed in any community has more to do with actual air quality than with any socioeconomic variables (12). In the Buffalo studies, the frequency of "serious" responses increased as air quality deteriorated (13), and in Nashville, for persons of the same socioeconomic class (a rating based on education, occupation, amount and source of family income, condition of the dwelling and number of persons per room), the percentage of those bothered by air pollution increased as the pollution level increased and not as some other variable changed. In areas with low or medium levels of pollution, women of low socioeconomic status more frequently expressed concern about air pollution than women of high status; in areas of high pollution, more women of high status expressed concern (42: p. 422). In general, public concern about air pollution was higher in central urban areas where pollution levels were higher. Prah et al., however, found no significant relationship between questionnaire variables and suspended particulate mass concentration. They suggest that as pollution levels increase, the public may accommodate itself to the change, at least to the point of a crisis (36: p. 18).

Denial

Accommodation to air pollution, or denial that it exists, is clearly present in all studies, given the numbers of people who say it is not a serious problem even in communities where recorded levels of air pollution are very high. One aspect of this psychological mechanism was explored by Creer at al. in a Utah town near a steel plant which employed some 40% of the population (7). Respondents with high economic dependence on the pollution source, i.e., those who were employed there, were slightly less aware of air pollution (75%) than those with low economic dependence (88%). Moreover, 80% of those in the low economic dependence group were highly bothered by air pollution as against only 19% in the high economic dependence group. The same relationships held true when responses were grouped by age, sex, and education. The authors conclude that Festinger's theory of cognitive dissonance can offer an explanation of these findings: those persons who are employed by a polluting industry and experience poor air quality tend to alter their beliefs or attitudes concerning the situation, perceiving a less serious pollution problem, rather than change their behavior by seeking other employment or place of residence.

Several studies have sought to correlate community satisfaction with awareness and concern over air pollution. The Nashville data indicated that "several thousand of the total population were very concerned about air pollution as a health problem, but not to the extent that they planned to move from their homes" (42: p. 420). In the Buffalo and St. Louis studies, air pollution was rated as worse in the community as a whole than in the respondent's neighborhood (13, 40), and similarly in Durham, N.C., respondents were more likely to view air pollution as a serious national problem than as a serious local problem (33). Thus, as Degroot and Murch suggest, there may be a tendency for residents to defend their own community and, as in the Creer study, alter their perceptions rather than their behavior. One might then expect that long time residents of a given community would express the most satisfaction with that community and show less awareness or concern over air pollution. This hypothesis is, however, not supported by the Clarkston data, where longer residence was associated with greater concern (30). The authors suggest a contrary

hypothesis, that "concern with air pollution in Clarkston does not apparently stem from, lead to, or express generalized negative feelings towards or rejection of the community as a place to live; on the contrary, such concern appears to grow out of widespread feelings of civic pride and community satisfaction and to lead to attempts to ameliorate the situation" (p. 54).

Prah's study in Indianapolis found no relationship between awareness and length of residence; although 37% said they would like to move from Indianapolis, only 2% of them said they would move because of air pollution (36).

Willingness to Pay

From 1967-1971 the Harris poll reported that the percentage of persons nationally who would pay $15 per year to finance a federal program to control air pollution rose from 44% to 59%. In late 1971, Roper found that about six out of ten persons would pay 10% more for such things as detergent, gasoline, automobiles, electricity, if it were essential to eliminate the pollution caused by their manufacture (16).

In St. Louis, about 85% indicated they would pay $1 more in taxes for pollution control; about 64% would pay a $5 cost-of-living increase (40). In Pasadena, almost 90% would pay more than $1 per month to eliminate pollution (41), but a more recent study in Toledo found a majority of respondents unwilling to accept any increase in family expenses to defray pollution costs (5).

Prah et al. report that over 75% agreed with the statement that polluters should pay the cost of cleaning up, but also that 94% thought "we can all afford a little sacrifice for the sake of our environment" (36). Similarly, in a recent study of the Four Corners area of New Mexico and Arizona, respondents were willing to pay between $1.50 and $2.00 more on their electricity bills or sales tax to abate pollution from local generating stations, but the vast majority felt that part of the cost should be borne by the polluting industries (14).

The Alabama study asked a variety of questions pertaining to expenditure on pollution control. Regarding priorities for government spending,

85.4% were willing for the government to spend "more" on education but almost as many, 83.5%, favored increased expenditure on pollution control. When the question was put another way, however, only 8.1% preferred meeting the costs of pollution reduction through higher taxes and 2.7% through higher product costs; 59.8% preferred that the polluters themselves pay the bill. Although from 60% to 70% indicated a personal willingness to pay for abatement, 38.5% were unwilling to take any pay reduction in order to live and work in a pollution-free area.

Quality of Life

So far we have reviewed studies that used questionnaire surveys to investigate awareness and concern over air pollution, the salience of air pollution as a problem nationally and locally, the relationship between perception of air pollution and various socioeconomic factors, and willingness to pay for pollution abatement. In all of these surveys, respondents were asked direct questions on each topic (Have you been bothered by air pollution?) or asked to volunteer information (What are major community problems?). Geared largely, at least in the earlier studies, to issues of public health, few sought to relate air pollution to general community satisfaction or personal happiness. Medalia raised this issue, as noted above (30), and in the Johnson study of Los Angeles, we find the significant statement that

> almost everyone did report feeling different "on a smoggy day as compared to a clear day." The most frequent feeling was depression. Others reported feeling anger, or some quality of anger such as irritation or disgust. A third of the sample, however, reported a physical irritation - burning eyes, nausea, or a general sick feeling - rather than an emotional or psychological state of feeling.(22: p. 539)

It therefore seems relevant to examine further some studies of community or neighborhood satisfaction, on the one hand, and of personal happiness or satisfaction on the other.

Community Satisfaction

A scale developed by Davies (11) was originally used to rate the degree of community satisfaction among rural residents. The final version consisted of 40 opinion statements, all of which yielded an acceptable discriminative value. His findings, other than methodological, were that community satisfaction was unrelated to sex difference; that for subjects aged 15-20, no significant relationship existed between community satisfaction and age; and that a moderate relationship existed between community satisfaction and intelligence scores. Jesser (21) adapted Davies' schedule to test the hypothesis that in rural areas, the community satisfaction of persons in the social-helping professions (teachers, clergy) would be lower than that of persons in technical-helping professions (doctors, lawyers). This hypothesis was verified; some other factors significantly associated with community satisfaction were: being located in a place of 1,000 or more population; scoring higher on formal social participation items; having moved three or more times in the last thirteen years. Factors which tended toward higher community satisfaction but not at an accepted level of significance were income - over $6,900; residence - ten years or more in the community; age - 50 or older; and sex - female.

A second adaptation of Davies schedule was used to test the hypotheses that (a) community satisfaction is a multidimensional variable and (b) that a positive relationship between community satisfaction and community size will hold regarding those specialized services and opportunities frequently inadequate or unavailable in rural communities, and a negative relationship will hold regarding gemeinschaft-like attributes. Data collected in urban and rural communities of North Dakota supported both hypotheses (23).

A different approach was adopted by Lansing and Marans (26). They point out that efforts to improve neighborhood quality generally assume that architects or planners can distinguish good from bad neighborhoods and can isolate specific features that are related to overall quality. In their study, 100 clusters of three or four homes scattered throughout Detroit were rated independently by the people living there and by an

architect-planner. Results showed that of the people who live in neighborhoods rated pleasant, 62% like them very much; of those in neighborhoods rated unpleasant, 20% like them very much. The quality of structures as rated by the planner was the best predictor of how well people liked their neighborhood. Features which had less relevance to overall satisfaction included land use character, age of structures, general maintenance level of the area, proximity to adjacent structures, setback, lack of usable outdoor space, off-street parking, tree coverage, visual activity level, noise intensity, and pollution-smoke level.

Happiness

In national opinion polls, the reported level of happiness has been declining since the end of World War II, measured by responses to a direct question such as "In general, how happy would you say you are - very happy, fairly happy, or not very happy?" Analyzing responses to this and a number of related questions, Dalkey *et al.* (10) conclude that people feel the quality of life is improving in some ways but deteriorating in others. From the stand-point of health and knowledge, things are improving but in the qualities most relevant to happiness, e.g., inner happiness, moral conduct, peace of mind, things are getting worse. Respondents may think people were happier in the "good old days" but for the most part would not have preferred to live then.

One of the most intensive studies of happiness was undertaken by Bradburn and Caplowitz, 1965 (4). As part of a mental health study, an attempt was made to see how self-assessments of happiness were distributed throughout social groupings and how that population varies over time in its level of happiness. Interviews in four Illinois communities revealed only slight differences across communities differing in degree of economic prosperity, but led to the hypothesis that a person's sense of well-being can be understood best as a function of the relative strengths of the positive and negative feelings experienced in the recent past. That is, feeling states were composed of two almost completely unrelated dimensions, positive and negative. The balance between the two dimensions determines whether or not the individual responds as "happy" or "unhappy."

More specifically, Bradburn and Caplowitz found that 24% were very happy, 59% pretty happy, and 17% not too happy. There was a strong positive correlation between happiness and both education and income, a marked negative correlation between happiness and age, and no difference between men and women. Unmarried persons were considerably less happy than those who were married, and among the unmarried, men were twice as likely as women to report being "not too happy." The percentage of those "not too happy" rose to 33 among unemployed men. Among women, those who defined themselves as being in the work force but unemployed report unhappiness about as frequently as men, but there was little difference in reported happiness between employed women and full-time housewives (pp. 8-15).

The Dalkey study reports on a number of approaches to defining and evaluating individual perceptions of the quality of life (10). A list of nine items was devised containing "general factors that are presumed to be significant in determining the well-being of humans." Twelve members of the Rand staff were asked whether these factors were meaningful, measurable, and what relative weight would be assigned to each by the average American. The panel generally agreed that the items were meaningful and that all were measurable except freedom, novelty, and aggression. The median relative weights, normalized to total 100, were:

Factor	Median Weight
1. Health	20
2. Status	14
3. Affluence	14
4. Activity	12.25
5. Sociality	9.8
6. Freedom	8.2
7. Security	8.2
8. Novelty	7.2
9. Aggression	6.1

The exercise was repeated with a group of students from California Polytechnic Institute resulting in an entirely different set of weights: freedom was at the top and affluence near the bottom.

From these and other small-scale exercises conducted at Rand, the authors conclude that "whatever QOL is, it is determined mainly by some very general features of the individual and his environment, and not by

specifics. What this means is that two different individuals who score about the same on a QOL scale should, for example, report about the same degree of contentment with their lot, irrespective of the special circumstances that make up the score."

A study that sheds further light on one of these factors is a Ph.D. dissertation by Ziglin (47) in which senior citizen couples in or nearing retirement were interviewed regarding the quality of life and specifically its relationship to health. The respondents generally indicated that the quality of health was an important factor in the overall appraisal of the quality of life, but the precise relationship was unclear when all subjects were grouped together. Factor analysis revealed that subjects with high security orientation tended to emphasize health as a crucial variable in the quality of life while the interpersonally oriented de-emphasized the importance of health. Further analysis showed that, at least for couples in this age group, the wife's health was the critical consideration in the couple's perception of the importance of health, suggesting a role reversal in which the female becomes more important when the male (who tends to be older and in poorer health) is no longer the breadwinner.

Several factors in the Dalkey scale - meaningful activity, freedom, security, affluence - might well be subsumed under job satisfaction. If a person holds a job which he or she rates as satisfactory, that job would probably provide those attributes in large measure, thus influencing the overall quality of life rating. The literature on job satisfaction is extensive; we were most interested in those studies which related job satisfaction to socioeconomic variables rather than to conditions of work. Hulin (20), for example, found that job satisfaction was higher in communities with substantial slum areas, suggesting that the worker assesses his position with respect to visible alternatives. Katzell, Barrett, and Parker (24), and Cureton and Katzell (9) found job satisfaction and performance to be inversely related to the degree of urbanization of the community; and Bell (2) and others suggest that anomie is associated with lower-class, highly industrialized situations. In a study of male blue-collar workers in 21 plants in the eastern United States, Blood and Hulin found that slum conditions, cost of living, and urban growth were the best predictors of

alienated responses on job satisfaction (3). Middleton examined six types of alienation - powerlessness, meaninglessness, normlessness, cultural estrangement, social estrangement, estrangement from work - among a random sample in a city in central Florida (32). With the exception of cultural estrangement, the association between each type of alienation and each other type was moderately strong; the type most highly correlated with the others was estrangement from work. The percentage of Negroes who felt alienated was higher than among whites for each type except cultural estrangement. An inverse relationship was found between education and sense of meaninglessness, but stronger among whites than among Negroes, suggesting that education is of greater significance for the former.

BIBLIOGRAPHY

(1) Anderson, R. J., and Crocker, T. D. "Air Pollution and Property Values: A Reply." Review of Economics and Statistics 54 (1972): 470-473.

(2) Bell, W. "Anomie, Social Isolation, and the Class Structure." Sociometry 20 (1957): 105-116.

(3) Blood, Milton R., and Hulin, Charles L. "Alienation, Environmental Characteristics, and Worker Responses." Journal of Applied Psychology 51 (1967): 284-290.

(4) Bradburn, Norman M., and Caplovitz, David. Reports on Happiness: A Pilot Study of Behavior Related to Mental Health. Chicago: Aldine Publishing Co., 1965.

(5) Brunner, J. A.; Gravengaard, P.; and Bennett, G. Pollution in the Local Community: Citizen Attitudes and Willingness to Make Personal Sacrifices in Abatement. Occasional Paper 23. Toledo, Ohio: University of Toledo Business Research Center, December 1973.

(6) Chambers, L. A. "Risks Versus Costs in Environmental Health." In The Economics of Air Pollution, ed. H. Wolozin, pp. 51-60. New York: W. W. Norton, 1966.

(7) Creer, Ralph N.; Gray, R. M.; and Treshow, M. "Differential Responses to Air Pollution as an Environmental Health Problem." Journal of the Air Pollution Control Association 20 (December 1970): 814-818.

(8) Crowe, M. Jay. "Toward a 'Definitional Model' of Public Perceptions of Air Pollution." Journal of the Air Pollution Control Association 18 (March 1968): 154-157.

(9) Cureton, E. E., and Katzell, R. A. "A Further Analysis of the Relations Among Job Performance and Situational Variables." Journal of Applied Psychology 46 (1962): 230.

(10) Dalkey, Norman C.; Lewis, R.; and Snyder, D. Measurement and Analysis of the Quality of Life: With Exploratory Illustrations of Applications to Career and Transportation Choices. Santa Monica, California: Rand Corporation, August 1970.

(11) Davies, Vernon. "Development of a Scale to Rate Attitude of Community Satisfaction." Rural Sociology 10 (September 1945): 246-255.

(12) Degroot, Ido. "Trends in Public Attitudes Toward Air Pollution." Journal of the Air Pollution Control Association 17 (October 1967): 679-681.

(13) Degroot, Ido; Loring, W.; Rihm, A., Jr.; Samuels, S. W.; and Winkelstein, W., Jr. "People and Air Pollution: A Study of Attitudes in Buffalo, N. Y." Journal of the Air Pollution Control Association 16 (May 1966): 245-247.

(14) Eastman, Clyde; Randall, A.; and Hoffer, P. L. "How Much to Abate Pollution?" Public Opinion Quarterly 38 (Winter 1974-1975): 574-584.

(15) Environmental Quality: A Survey of Costs, Benefits, Citizens' Attitudes. A Report prepared for the Second Annual Alabama Environmental Conference. Auburn, Alabama: Department of Civil Engineering, Auburn University, October 1971.

(16) Erskine, Hazel. "The Polls: Pollution and its Costs." Public Opinion Quarterly 36 (Spring 1972): 120-135.

(17) Fellmeth, R. C. Politics of Land: Ralph Nader's Group Report on Land Use in California. New York: Grossman, 1973.

(18) Freeman, A. M. "Air Pollution and Property Values: A Methodological Comment." Review of Economics and Statistics 53 (1971): 415-416.

(19) Hite, J. C.; Macauley, H. H.; Stepp, J. M.; and Handle, R. The Economics of Environmental Quality. Washington, D. C.: American Enterprise Institute for Public Policy Research, 1972.

(20) Hulin, Charles L. "Effects of Community Characteristics on Measures of Job Satisfaction." Journal of Applied Psychology 50 (1966): 185-192.

(21) Jesser, Clinton. "Community Satisfaction Patterns of Professionals in Rural Areas." Rural Sociology 32 (March 1967): 56-69.

(22) Johnson, Dale L., et al. "Air Pollution: Public Attitudes and Public Action." American Behavioral Scientist 15 (1972): 533-561.

(23) Johnson, Ronald L., and Knop, Edward. "Rural-Urban Differentials in Community Satisfaction." Rural Sociology 35 (December 1970): 544-548.

(24) Katzell, R. A.; Barrett, R. S.; and Parker, T. C. "Job Satisfaction, Job Performance, and Situational Characteristics." Journal of Applied Psychology 45 (1961): 65-72.

(25) Kneese, A. V. "Air Pollution: General Background and Some Economic Aspects." In The Economics of Air Pollution, ed. H. Wolozin, pp. 23-39. New York: W. W. Norton, 1966.

(26) Lansing, John B., and Marans, Robert W. "Evaluation of Neighborhood Quality." Journal of the American Institute of Planners 35 (May 1969): 195-199.

(27) Lave, Lester B. "Air Pollution Damage: Some Difficulties in Estimating the Value of Abatement." In Environmental Quality Analysis, ed. A. V. Kneese and B. T. Bower, pp. 213-242. Baltimore: 1972.

(28) Lave, Lester B., and Seskin, E. P. "Air Pollution and Human Health." Science 169, no. 3947 (21 August 1970): 725-733.

(29) Lave, Lester B., and Seskin, E. P. "Health and Air Pollution: The Effect of Occupation Mix." Swedish Journal of Economics 73 (March 1971): 76-95.

(30) Medalia, Nahum Z., and Finkner, A. L. Community Perception of Air Quality: An Opinion Survey in Clarkston, Washington. Public Health Service Publication No. 999-AP-10. Cincinnati, Ohio: Robert A. Taft Sanitary Engineering Center, June 1965.

(31) Michelson, Irving, and Tourin, Boris. "Comparative Method for Studying Costs of Air Pollution." Public Health Reports 81 (1966): 505-511.

(32) Middleton, Russell. "Alienation, Race, and Education." American Sociological Review 28 (1963): 973-977.

(33) Murch, Arvin W. "Public Concern for Environmental Pollution." Public Opinion Quarterly 35 (Spring 1971): 100-106.

(34) "Pollution Controls and Your Pocketbook." National Parks and Conservation Magazine 49 (March 1975): 28.

(35) Pollution Primer. Pittsburgh, Pa.: TB League, 1969.

(36) Prah, Delmar H.; Brenchley, D. L.; and Potter, H. R. "Respondents' Perception of Air Quality in Indianapolis." Paper presented at the 66th Annual Meeting of the Air Pollution Control Association, Chicago, 24-28 June, 1973.

(37) Ridker, R. G. "Strategies for Measuring the Cost of Air Pollution." In The Economics of Air Pollution, ed. H. Wolozin, pp. 87-101. New York: W. W. Norton, 1966.

(38) Ridker, R. G., Economic Costs of Air Pollution. New York: Praeger, 1967.

(39) Ridker, R. G., and Henning, J. A. "The Determinants of Property Values with Special Reference to Air Pollution." Review of Economics and Statistics 49 (1967): 246-257.

(40) Schusky, Jane. "Public Awareness and Concern with Air Pollution in the St. Louis Metropolitan Area." Journal of the Air Pollution Control Association 16 (February 1966): 72-76.

(41) Silverblatt, Helene; Weiss, M.; Smith, N.; Smith, J.; McEnnery, S.; Green, D.; and Cederbaum, E. "A Survey of the Pasadena Community on Air Pollution." In Air Pollution Project, pp. 73-131. Pasadena, California: Associated Students of the California Institute of Technology, Summer 1968.

(42) Smith, Walter S.; Schueneman, J. J.; and Zeidberg, L. D. "Public Reaction to Air Pollution in Nashville, Tennessee." Journal of the Air Pollution Control Association 14 (October 1964): 418-423.

(43) Steele, W. J. "The Effect of Air Pollution on Single Family Residential Property in Charleston, South Carolina." M. S. thesis, Clemson University, 1972.

(44) U. S. Department of Agriculture. Air Pollutants Affecting the Performance of Domestic Animals: A Literature Review. Washington, D.C.: Government Printing Office, 1970.

(45) U. S. Public Health Service. Highlights of Selected Air Pollution Research Grants. Washington, D. C.: Government Printing Office, 1970.

(46) Zerbe, R. O. The Economics of Air Pollution: A Cost-Benefit Approach. Toronto: Ontario Department of Public Health, 1969.

(47) Ziglin, Alan L. "Some Aspects of the Quality of Health and Their Relationship to Quality of Life Orientations." Ph.D. dissertation, University of Georgia, 1974. (Abstract)

APPENDIX B

ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF CLAIRTON, PA

The city of Clairton lies on the western bank of the Monongahela River in the southern part of Allegheny County. The river, winding its way northward to join the Allegheny in Pittsburgh, some twenty miles downstream, makes a large bend to the west, leaving a spacious flat area within the bend. On either side, to the west and east, the land rises steeply in high bluffs.

In the closing decades of the nineteenth century, the Clairton area was sparsely settled; the flat land was the site of an amusement part where a merry-go-round and dance pavillion lured Pittsburghers to make the two-hour trip by packet boat at the cost of 50¢ for a evening's entertainment. Today the river is dominated by the giant mills that crowd its banks: United States Steel's Clairton Works, Irvin Works, National Tube at McKeesport, Duquesne, Edgar Thomson, Carrie Furnaces, Homestead, and finally, J & L's Pittsburgh Works. The pleasure boats still ply the river on summer evenings but there are no amusement parks on its banks.

Clairton is the site of the world's largest privately-owned coke works. Coke production in the region goes back at least to the early 1870s when Thomas F. Connelly built sixty bee-hive ovens in what is now the south end of the plant, known as Connelly's Yard. Rapid industrialization began after the turn of the century; the St. Clair Furnace Co. erected three blast furnaces, and the St. Clair Steel Co. built twelve open-hearth furnaces, a forty-inch blooming mill and a slabbing mill, plants which were later sold to Crucible Steel and in 1904 were acquired by the new giant steel corporation which bought out the Frick-Carnegie interests. Known then as the Carnegie-Illinois Steel plant, the site was chosen after World War I for construction of by-product coke ovens, then replacing the old bee-hive method of coke production. In 1918, twelve batteries of 64 ovens each were built; by 1924 six more batteries of 61 ovens had been completed, and by 1927, four batteries

of 87 ovens each. By 1959, the total had reached 1567. Until 1962, when they were discontinued, the plant also had blast furnace and open hearth operations.

The rapid expansion of coking capacity had a profound effect on the settlement and administration of the Clairton region. Prior to World War I, the area was divided into three jurisdictions: the Borough of Clairton (1903), the Borough of North Clairton (1915) - formerly the Blair District and still known by that name - and the Borough of Wilson (1907) which included the unincorporated towns of Wilson, Coal Valley, and Mendelssohn, all north of Peter's Creek which divides the city into two sections. The growth of the steel and coke plant, which operated and paid taxes in all three boroughs, made such jurisdictional divisions anachronistic, and in 1920 a merger was voted upon, resulting in 1922 in the creation of the city of Clairton.

Characteristics of the Population

As shown in Table 4, the population figures for Clairton reflect rapid growth up to 1930. The economic stagnation of the early thirties ended in mid-1936 when the coke batteries resumed capacity operation. A further boost to the region came in January of 1937 when USS announced its intention to build the world's largest continuous hot strip mill and cold reduction unit. This mill, the Irvin Works, was originally planned for Clairton, prompting a full page of advertisements in the local paper from merchants and banks, expressing their thanks to the company. The site was later changed to Camden Heights, just adjacent to Clairton on the north.

TABLE 4

Total Population, Clairton City, 1910-1970*

Year	Total Pop.	% Change
1910	4,434	-
1920	10,777	88.3
1930	15,291	144.1
1940	16,381	7.1
1950	19,652	20.0
1960	18,389	-6.4
1970	15,051	-18.2

*Figures for 1910 and 1920 represent combined population of Clairton, N. Clairton, and Wilson Boroughs.

The population has been declining since its peak in 1950, and is today back at the 1930 level. This outflow can be explained in part by the increasing mobility of the work force. At the Clairton Works, the level of employment has remained fairly stable at 4500 since 1950. The company estimates that 70 to 75% of its Clairton work force lives in the vicinity of Clairton, but an increasing proportion evidently live outside the city limits. In 1965 it was reported that over 41% of Clairton's industrial employees did not live in the city. Commenting on the population loss, an editorial in the Clairton Progress, 28 September 1960, noted people's preference for the green grass and fresh air of the suburbs, and proposed that Clairton try to attract residents by "more green grass, accelerated air pollution programs and houses built with more land space for families."

Nevertheless, the decline has continued, affecting in particular young adults 20 to 40 years of age, as shown in Table 5, and the population is increasingly composed of persons 60 and over.

TABLE 5

Population of Clairton by Age
1950 - 1970

	1950	1960	1970
Total	19,652	18,389	15,051
0-9	3,884	3,907	1,319
10-19	2,891	3,047	2,967
20-29	3,366	2,049	1,839
30-39	3,396	2,526	1,291
40-49	2,594	2,526	1,978
50-59	1,893	2,058	2,032
60 and over	1,646	2,276	2,525
% 60 and over	8.38	12.38	16.78

The racial composition of the population has also undergone significant changes. In 1920, nearly one-third of Clairton's residents were foreign born, and 61% of its native-born white population had foreign or mixed parentage. The principal ethnic backgrounds represented are Eastern and Southeastern European: Polish, Czech, Austrian, Yugoslavian, Italian, and Greek. While the percentage of foreign-born white has gone steadily downward, the nonwhite population has increased as steadily to its present 25% level, as shown in Table 6:

TABLE 6

Population of Clairton by Parentage and Race
1910 - 1970

	1910	1920	1930	1940	1950	1960	1970
Total Pop.*	3,326	6,264	15,291	16,381	19,652	18,389	15,051
Native white	2,005	3,673	10,172	11,595	14,184	12,926	10,355
Native Par.	870	1,391	4,995	-	-	9,053	7,030
Foreign & mixed Par.	1,135	2,282	5,177	-	-	3,873	3,325
For. born white	1,257	1,965	2,959	2,462	2,058	1,450	952
Negro	63	621	2,070	2,324	3,408	4,029	3,773
Other	1	2	49	-	2	4	20
% Native white	60.2	58.7	66.5	70.8	72	70.3	68.8
% For. Born (white)	37.5	31.4	19.4	15.0	15	7.9	6.3
% Negro	1.9	9.9	13.5	14.2	17.3	21.9	25.2

*Figures for 1910, 1920 represent the Borough of Clairton prior to merger.

Economic Characteristics

The economy of the city is today dominated by primary metals manufacture as it has been throughout its life. The major industrial employers are U. S. Steel's Clairton Works, and the Pennsylvania Industrial Chemical Corporation (PICCO) now owned by Hercules. Table 7 shows the dominant position which manufacturing holds in the city's employment:

TABLE 7

Employees by Industry Group

Industry Group	1950	Rank	1960	Rank
Construction & Mining	301	5	218	7
Manufacturing	4,518	1	3,226	1
Transport & Pub. Utilities	311	4	222	6
Wholesale & Retail	918	2	893	2
Business & Repair	170	8	83	8
Personal Services	396	3	314	4
Professional & Related	263	6	397	3
Public Administration	197	7	245	5
Not Reported, Misc.	57	-	404	-

A further breakdown of the employment picture is given in Table 8, showing that in the male labor force, craftsmen, operatives, and laborers constitute the major categories. Clairton is a blue-collar town, with a low but increasing percentage of women in the labor force.

TABLE 8

Labor Force of Clairton by Occupation & Sex
1950 - 1970

	1950		1960		1970	
	M	F	M	F	M	F
Total	6,037	1,518	4,841	1,716	3,479	1,874
Employed	5,732	1,399	4,472	1,530	3,313	1,756
Unemployed	300	108	364	186	149	118
% unemployed	5.0	7.1	7.5	10.8	4.3	6.3
Professionals	317	184	337	224	306	210
Managers	339	56	182	51	189	54
Clerical, sales	519	711	487	712	390	877
Crafts, foremen	1,604	16	1,231	9	911	35
Operatives	1,456	118	967	69	568	71
Service, non-domestic	256	196	257	273	329	414
Domestic service		68		103		57
Labor (non-farm or mine)	1,188	22	858	22	451	32
Not reported	70	26	153	63	247	174

Median family income is shown in Table 9 with comparisons to Pittsburgh and the Commonwealth of Pennsylvania. In 1969, 10.7% of Clairton's families had incomes below the poverty level. Almost one-half of these families had female heads.

TABLE 9

Median Family Income

	1950	1960	1970
Clairton	3,323	5,311	8,661
Pittsburgh SMSA	3,344	5,954	9,737
Pennsylvania	3,214	5,719	9,558

Housing structures in Clairton are generally old; only one-third of present structures have been built since 1940, as shown in Table 10.

TABLE 10

Housing in Clairton

	1960	1970
Total housing units	5,511	5,119
Owner occupied	3,345	3,011
Renter occupied	2,016	1,935
Vacant	150	173
Year built (structure)		
1969 - March 1970		0
1965 - 1968		28
1960 - 1964		86
1950 - 1959		637
1940 - 1949		1,055
1939 or earlier		3,324

The picture of Clairton that emerges from these statistics is of an aging industrial town, beset by an exodus of its more vigorous residents - young, middle-income families - and a corresponding preponderance of the old and the poor. In addition, it is plagued by constant air pollution from one of Allegheny County's major polluters: the coke works.

Dirty air is legendary in the Pittsburgh region. A visitor to the city in 1850 described its effects thus:

> At Pittsburgh we went to see some manufacturies, and iron foundries, in a sort of coal-scuttle on wheels. No mourning coach was ever so thoroughly black, methinks, inwardly and outwardly; and, that we might be in keeping with our vehicle, we found it obligingly undertook (without any outlay or trouble on our part) to put us all into decent mourning. . . . The driver was hopelessly black, having the features, however, of a white man, and the brogue of the Green Erin.[1]

And old-time residents still recall the days when a hostess could not lay the dinner table in advance of a party for the plates would become too dirty to dine from.

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[1] E. Wortley, quoted in Pittsburgh Regional Ecology, E. R. Schmidt and D. B. Schmidt, eds. (California, PA: Vulcan Press, n. d.), pp. 68-69.

There have been two phases in the battle for clean air: smoke control which began in the 1940s, and air pollution control beginning in 1970. The City of Pittsburgh in 1941 adopted an ordinance which declared smoke a nuisance, using the Ringelmann chart to determine density. It set emission standards for fly-ash, required the use of smokeless solid fuel, and regulated construction and installation of all fuel-burning plants. In 1949, a similar ordinance was adopted by Allegheny County. When, in 1957, the City Health Department was absorbed by the county, a single Bureau of Air Pollution Control was created to serve all of Allegheny County. The major area of progress during this first phase was in home heating: by 1956, more than 90% of homes were heated by gas or oil.

The second phase followed passage of the Federal Air Quality Act in 1967, which directed the states to set state-wide ambient air quality standards based on federal criteria. In accordance with this act, public hearings were held in Pittsburgh during September 1969, coinciding with public hearings on revision of Allegheny County's regulations. Both hearings were attended by unexpected numbers of people, urging more stringent standards.

The rules and regulations adopted by Allegheny County in 1970 (and subsequently revised, presently Article XVIII) reflect public demand for more stringent control and for citizen participation. In addition to setting emission standards and ambient air quality standards, the regulation establishes a five-member Variance Board to hold public hearings on requests for exemptions or variance from compliance with established standards. Public hearings are also required prior to any amendment to the regulations.

The Clairton Coke Works is one of the major obstacles to clean air in Allegheny County. Daily, the ovens consume some 31,000 tons of coal which, after emerging as coke, is quenched with 2 million gallons of contaminated water, the waste liquor from other plant processes. This water contains, daily, 24,000 lbs. of phenol, 44,000 lbs. of chlorides, 2,550 lbs. of cyanides, 13,400 lbs. of SO_4, and 53,100 lbs. of ammonia, making a total of 68.6 tons of chemicals emitted as steam. In addition, sulphur and dust emitted from the ovens and boilers comes to 211 tons per day.

The company acknowledges the harm caused to the plant itself by these emissions. Mr. R. R. Campbell, Supervisor, in a letter of 26 June 1968, to the Vice-President of Applied Research, USS, said:

> While it has been difficult to estimate the added cost of accelerated corrosion due to quenching coke with contaminated water [i.e., containing ammonium chloride] various estimates had placed the figure at something in excess of $600,000 per year.[1]

The Bureau of Air Pollution Control has concerned itself with two types of problems at Clairton. First is the emissions from the coke ovens themselves, especially during the charging and pushing operations. The company has been repeatedly cited for smoke violations from the coke oven battery stacks. In addition, leakages from the aging batteries and from faulty oven doors contribute to the problem. The second problem is that of quench water. The county regulations prohibit use of water that does not meet the standards set by Pennsylvania's Clean Streams Act. The company is, however, also prohibited from dumping the contaminated water back into the Monongahela, and claims that use of the water for quenching is the only way to get rid of it.

After repeated citations on both problems, and hearings before the Variance Board, Allegheny County and the Commonwealth in early 1972 filed a joint suit in Common Pleas Court to compel USS to reduce air pollution inside and outside the Clairton Coke Works. After months of negotiation, three consent decrees were signed in which USS agreed to reduce immediately the emissions from faulty coke ovens and complete the cleanup by 1977, to build a water treatment plant to remove contaminants from waste water, and to initiate measures for desulfurization of coke oven gas. In mid-1973, USS was charged with violation of the consent decrees, and the case is still under litigation.

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[1] Quoted by Pat Newman, Report on Dec. 20, 1971, Meeting on USS Clairton Works, GASP, 1 Jan. 1972, p. 2.

APPENDIX C

ANALYSIS OF THE PERCEPTION OF MAJOR SOCIAL PROBLEMS

"There Are Some Things You Can't Live With"

To the observer who approaches Clairton by car from Pittsburgh or who flies over Allegheny County, the heavy pall of noxious, multi-colored smoke lying over the town and its environs is the region's most noticeable feature. The researcher, developing a questionnaire to measure the local residents' perceptions of the quality of life in that community and having observed the physical evidence, inevitably has preconceptions regarding the salience of air pollution as a local issue.

In the process of developing a survey instrument for measuring community attitudes to air pollution, we held two group interviews, each with approximately twelve participants, followed by ten individual depth interviews with residents of Clairton and nearby communities. The interviews had two purposes: first to increase our understanding of the problems and concerns of the residents of the community, and second, to help us generate specific hypotheses to be tested systematically. Although it is by no means essential to our hypotheses, it would be most desirable, from a research point of view, if we were to find a high level of conscious salience for environmental pollution as a local issue and, furthermore, if we were to find that there was a close connection perceived by local residents between pollution and their personal and social life. However, neither our preliminary evidence, or that of other investigators suggests such a degree of salience or a clearly perceived relationship by residents of polluted areas between pollution of the environment and the personal, psychological or social problems which may beset the community.[1]

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[1] See, for example, J. Schusky, "Public Awareness and Concern with Air Pollution in the St. Louis Metropolitan Area," Journal of the Air Pollution Control Association 16: 72-6, and the study by Daniel Yankelovich, Inc., summarized in R. G. Ridker, Economic Costs of Air Pollution (New York: Praeger, 1967).

This is not to say that residents are not aware of pollution in their towns (as will become apparent), but rather that it is seldom in the forefront of their thinking when they are asked to discuss with the interviewer the communities they live in or their own personal lives.

The dominant issue for both black and white participants in the Clairton group interview was the school system's racial troubles, a problem to which the discussion kept returning. The basic distinction was well expressed by the minister who said there were some things he could live with, such as pollution, and some that he couldn't, namely school tensions, drugs, and pornography, all of which he found to excess in Clairton. This concern with problems other than pollution, problems which people "could not live with" and which are not perceived as related to pollution, was confirmed by the depth interviews.

A young black steelworker, for example, says:

> It's rough, that's all, the city is rough. You always see those stories about the city is a jungle? Well, this is a small jungle.

And another young black man sees drugs, and black and white relationships, as the key problems:

> The kids fight, and you have racial tension. It doesn't just be in one area, at the High School. We have racial tension, it should be everywhere. Now if somebody says, "What about the blacks, they throw at the white cars?" Well, it's a thing of getting their anger at something, this anger we got because you done this, up on the hill you arrested this person, or whatever might have happened. So when the cars go up and down Maple, they'll throw rocks at them. And they have hit black cars - the guy that was in here, they didn't know he had changed cars so they threw. I come up the hill, that big black Cadillac out there, well, they know. Then they know another thing: if you hit my car, I'm going to hit you! . . . I've been around a lot of people, I've seen a lot of drugs in this town. I know different guys I come out of school with, a lot of them are in Black Action, or Western Psych, or different drugs . . . Who knows what makes a person take drugs? I'm not talking about marijuana, I'm talking about hard drugs. A few of them have died, and they can see this is killing them. You have to steal to support your habit. What makes them do this? This town is like any other town, I guess, it has a drug problem. Right now it has a bigger drug problem because a lot of the younger people in school are getting caught selling drugs.

The anger and frustration of young blacks which this respondent refers to form the background for the following statement, another respondent's perception of a major social problem:

> Well, to give you an example: the steel mill down here hires very few young people from Clairton, and their reasons - I'm giving you this second hand - but the way I heard it was, they don't want to hire people from Clairton because they don't want to work. They'll work for a while and then they'll quit. And that's the attitude of a lot of people in Clairton, a lot of the younger set. And the younger set is starting to motivate the whole town.

Other white respondents see the increasing black population as the major factor contributing to Clairton's decay. In the interview with an elderly Yugoslavian who, with his wife, runs a bakery frequented by steelworkers, all discussions point to blacks as the major source of trouble. First, he says:

> Our city, it's going down every month, on account of this trouble we got . . . If we don't got no trouble, this city should be booming. We got a big factory, the biggest in the world, but these colored people . . . they make trouble for everybody. Before nobody started trouble. Somebody come from New York, from Chicago, they make this trouble for us here.

Then, rapidly diverging from the notion of outside agitators, he pins the source of all trouble on black youth:

> It's the young ones making trouble. The old people, you know every one of them, they're all right. But the young ones, they are troublemakers. I see the other day that four kids killed that woman over there. That's colored. Why they don't do something with those kids.

This hostility to blacks is evidently characteristic of the white population of the area, which voted heavily for George Wallace in the 1972 primary. The residents of Port Vue, for example, attribute the peacefulness and pleasantness of their community to, in part, the total absence of blacks. (One black family has recently moved in.) They also displayed considerable antipathy to welfare, which they see not as Christian charity but as a handout to lazy people who don't want to work. One perceptive Port Vue woman described her community as composed of lower middle class families "who feel insecure and threatened by both race and poverty."

The association between race and poverty, blacks and welfare, was elaborated upon in the depth interviews. A woman who runs a hotel and tavern in Glassport had this to say:

> I'll tell you right now, we have our people that I see come in and out of here, like every town has, those that are unemployed and on welfare are there because of their choice . . . and it irks me because they come in here and spend as much as a man that works 40 hours a week in the mill, and that bothers me . . . I'm ready to tell them, "Drink somewhere else, I don't want to be bothered." And they are unemployed and on welfare by choice, not by being forced into welfare.

And the Clairton baker, when asked about job opportunities in the town, said:

> Yeah, we got a lot of work but who's going to work? They get checks. That damned check what they get, it spoils everybody. . . . I call a couple guys, young guys, "No," they say, "I got check. I don't want to spoil my check." Nobody wants to work.

The baker's wife sees black youth living it up on welfare:

> They seem to demand more than what they can afford. I see numerous young men that should be working coming in with food stamps. As long as they move away from home they're entitled to that. They're living lavishly. They come in and order a sheet cake, a $10 sheet cake, and I was afraid to give that to them with food stamps, but the relief and the food stamp program said "Why, it's food!" They can buy all the food they want.

Another problem that was mentioned consistently in the depth interviews was Clairton's lack of recreational facilities.

> No, there's no kind of recreation in town. They all stay home and watch the television. That's all they can do, sit around and watch television, have a few drinks, that's it.

> No, there's no place to go. This place here at 9 o'clock is dead.

> I had to be in the street life [when I was a teenager] because there's no gyms here. There's no boys' club, no YMCA, no anything.

> I think the young people would like to stay in Clairton if there was something to do, if they could find employment. Then quite a few other people would stay here if recreation facilities were better.

The discontent over recreation is apparently an expression of a more deep-lying anxiety over today's youth, their evident lack of purpose and of respect for authority. As we shall see later, the adult population has found many outlets for community activity.

Emerging from these interviews are a host of social problems, expressed both overtly and covertly, which are typical of many small mill towns in the region and of American urban life more generally. We find concern over race, welfare, drugs, schools, and youth. Responses to questions regarding other community problems such as health care, shopping facilities, housing, urban blight, were not unanimous; some of our respondents were concerned about these issues while others were not. In no case were they ranked as among the town's most urgent problems. What is unusual in Clairton, however, is that concern over major social problems is coupled with a strong identity with the fate of the community and a determination to defend it against outside detractors.

Attitudes to Pollution

"On A Clear Day You Can See Across the Street"

Let us now examine in greater detail the attitudes of our respondents toward air pollution. While none of them deny the existence of pollution in their community, and attribute it solely to the mill rather than to automobiles or other industrial sources, they consistently deny that it is as serious a problem as "they" claim, and refuse to criticize U.S. Steel on this issue. Moreover, discussion of pollution in their community does not evoke the outpouring of resentment and antagonism toward the polluter that an outside observer might anticipate. In fact, in such circumstances, one often encounters antagonism toward those who have described or called attention to the pollution, or demanded that pressure be brought upon the polluter - legal, political or economic - to desist. When one interviewer asked, "Are there any days you notice the air?" one elderly man answered:

> No, that's just big politicians. They want money. Pollution! Pollution is nothing. This pollution was 50 years back. Fifty years back - pollution, pollution, pollution! Pollution

> is all right. Makes everybody work over there, gives everybody jobs over there. If not that pollution - close up; people starve to death. That's big jobs that pollution gives us. Nobody bothers - I'm here for 50 years now, pollution don't bother me. I'm close to the factory.

In the interview with an automobile mechanic from Glassport - just across the river from Clairton and downwind - the following exchange occurred:

> Q. Besides jobs, does the mill have any other effect on the community?
>
> A. You mean smoke, pollution?
>
> Q. How about that?
>
> A. I say, the man who said pollution, he's crazy.
>
> Q. What do you mean by that?
>
> A. There's a slim chance on that but to my mind . . . all these companies, years ago, they didn't have . . . different machinery, chemicals . . . but still you had smoke, you had fog, you had everything under the sun. And nobody done a thing for it, you lived just as well. Now, the least little smoke, they call it pollution. Who created pollution, who said the word pollution? This is politics.
>
> Q. You don't think it's much of a problem then?
>
> A. No, I don't think so.

Not only are politicians blamed for creating the pollution problem; local activists are cited and accused of using pollution for their own aggrandizement. An active unionist, a middle-aged steelworker said:

> I don't know. I think you got a certain group of people like MASH and GASP. People just want to get their name in the paper, like Michelle Madoff, she's always harping about pollution in Clairton, and I think she ran for council. She thought she would get elected on account of that; I don't think she did get elected.

And another local figure, a union official who was in the forefront of the battle over the granting of variances to U. S. Steel, although praised by one steelworker, was attacked by another for having political ambitions. Despite the feeling that the pollution issue has been exaggerated by politically motivated agitators, there is recognition that it poses an extreme health hazard - but only to the men who actually work on the coke

batteries. Other steelworkers and town residents are thought to be unaffected. Here is the response of a steelworker to the question "Is there much talk in Clairton about pollution?":

> A. Yeah, there's a lot of talking about it. The guys that are really in the middle of it, the guys that work on the batteries, the boys that work on the lids, they'd like to have better working conditions. But they'd also rather have work. They never complain; of course, it's tough on them, don't get me wrong, I wouldn't want to work out there myself. . . . That smoke is really bad, you breathe that smoke all day, you work there 10, 20 years.
>
> Q. Can you notice it?
>
> A. See this paper here I got? Now every month the company gives us the list of pensioners and the sick. Now you take coking, that's always the biggest amount of people that are sick.

When asked, however, about the people who live in Clairton, he replies:

> A. I don't think it affects them if they don't work down at the mill. I don't believe it affects me that much.
>
> Q. Do you think people notice it in the town from day to day?
>
> A. I don't think they noticed it until they start putting it in the papers and radios and television.

Another steelworker spoke even more pungently about the hazardous conditions on the batteries:

> The people on the batteries, they're the ones that are in all this pollution. They have these oxygen masks . . . breather apparatuses. Their function is limited, but without them they would be [unintelligible]. It's a known fact that after you get your pension off the batteries, 4, 5, 6, or 7 years is your limit. You're gone. Because that smoke, all that stuff flying around in the air just eats you up.

A 27-year-old black Vietnam verteran, born and raised in Clairton, spoke at length about pollution:

> Q. Let's talk about pollution again. You were talking before about the mill, do you think pollution's really a problem in Clairton?
>
> A. Me? No. Maybe I'm just used to it. Maybe I don't think too much about it, or worry too much about it, maybe because I'm young. The smoke, the smell, when you enter this town

you know you're coming into it, before you get here. You get the smell, and before you get here you can see the smoke. I don't think the pollution is much because I don't know too much about medicine. I don't know too much about what that smoke will do or what that cigarette will do to you either. They've just come out and said the cigarette is bad for you after so many years. So I couldn't really say the pollution is bad here. I know there is a pollution factor here, there is a lot of smoke here, and when I read about people who are authorities on this and they say that this is bad for your health, for pregnant people, people who have heart trouble, and older people, that they actually stay in when it gets above what it should be, you know. But as far as I'm concerned, I just don't pay it no mind. I mean, I work here, I ride by here maybe two or four times a day, maybe more, I don't even know the plant is there.

Q. You take it for granted?

A. Yeah . . .

Q. Do you ever worry about the effects of the pollution on you, on your job? Do you ever worry that it might be hurting your health?

A. No, I don't worry about it. Maybe because I'm on the steel side of the mill. I'm not up in the midst of it. Now I hear some guys down there that wear respirators. Some of the guys on the batteries say when they spit, you can see the black coming out; when they wash up, you can see it all over. They work right with this, they're right in contact with it. Where I'm at, it has to arrive and come forward maybe 500 yards or more, so when it gets to me it's smoke, it's not the direct thing. When I go to the cafeteria, I see some of the guys' clothes and they're filthy, and I've told them, "I'm not going down there to work with you."

The interview with the baker's wife, an elderly Yugoslav woman who has lived in Clairton since 1924, sums up many of the attitudes we have discussed. She sees the major problem of the community as one of race relations in the schools; she complains about welfare loafers, lack of hospitals and doctors, but the interviewer has to ask her:

Q. How about the health of Clairton residents generally?

A. The environment? You mean the pollution from the mills?

Q. Well, is it a problem?

A. No, we get some pollution only when the shift of the north wind would blow. But otherwise it goes across the river.

Q. Is this because of the way you're located? And just across the river is what?

A. Glassport and Port Vue. They get it. There's no vegetation growing across the river where the vapors from the coke works - the wind blows it that way. You think you're in the desert. There's no vegetation at all.

Q. And you don't find it very noticeable up here?

A. No. We've lived all these years and I can't say the pollution has bothered our health.

Q. Do people seem to discuss it a lot, talk about it, worry about the problem?

A. No, we take it for granted.

Q. As just something that's going to happen?

A. Well, I'm indoors most of the time. During the summer evenings, I sit on the back patio there.

And yet, although she has denied the effect of pollution on her health, and indicated that she doesn't notice it much, the interview continues:

Q. But do you think it's something that you yourself have simply grown used to and that's the reason you don't notice it? Or do you think it's just not as bad as a lot of people make it out to be?

A. Well, it really isn't bad every day. It might get bad for one day or two, and then the rest of the time in a whole month, you don't have any pollution at all in the city here.

Q. Have you read or heard about a lot of the talk that centers around Clairton in terms of the pollution problems?

A. I think it's all exaggerated. I really do. Other places have earthquakes. I have an aunt in Akron, she raised three sets of children, and there's an odor of the rubber factories over there that beats the vapors from Clairton a thousand times worse. I find Akron, Ohio, worse than the Clairton area.

Q. So when you think of pollution, you think of it more being a smell, rather than anything else - something you can see?

A. Oh, it isn't the smell alone, it's a fine sandy dust that falls from the atmosphere, from the smokestacks.

Q. You can notice it on your cars, on your house?

A. I notice it on my windowsills and I notice it on my car, definitely. I park my car in front of the bakery and every night, if I have to go to [my supplier] to buy some supplies, I'll have to put my water and my window wiper on my windshield on before I can start to go two blocks down. I know the pollution's there. It's visible, it's gritty, it cuts into the furniture.

Certainly, in the Clairton area, pollution is not seen as among the more important social problems that need immediate solution. Further, and perhaps more important, there tends to be a denial that pollution has any relationship to those other social problems. Thus, race relations, the increasing decrepitude of the town, political machines and their corruption, the educational system, the fact that people are leaving the community, the maintenance of economic health, jobs, drugs, and other aspects of youthful corruption and anti-authority attitudes and behavior - all are seen as real problems while pollution is an artificially created problem, foisted upon the community, simply adding a negative reputational factor to its already enormous burdens. This is not to say that residents deny the physical effects of pollution in their daily lives. Others, like the woman just quoted, blame pollution for dirt and additional housework:

> My daughter lives in Clairton; she has to wash her windows every day. Her sills always have a black ashy look on them, every day. So, if she wants her house nice, she's washing every day.
>
> I ran a sweeper here and there's spots here that I can't get clean because of the grit and grime we track in, ... I know I would put in wall-to-wall carpeting in my storeroom if we didn't have all the pollution, the dust and grit to ruin everything.

or for automobile maintenance problems:

> I have to wash [my car] every week because, if not, that'll eat the paint off.
>
> Guys have fairly good-looking cars and they would rather walk to work than drive their cars to work because the closer they are to the mills, the stronger the pollution is. And they don't want it messing up their cars.

for destruction of plant life and vegetation:

> I don't have any [plants outside]. I quit because they just wilted away, from all the pollution that comes up on the hill. And sometimes we get a whole lot of it.

and, rarely, for specific health hazards:

> You can see it, you can smell it, you can taste it. It's bad. It bothers me, because I have a son that was born with an allergy, different things would cause him to stop breathing. I watch him - when it's real bad out, he stays in.. . . My mother-in-law lives with us. She's 73 years old and I tell her, "Don't go out. There's nothing that important that you need outside."

What is striking about this series of specific attributions of living hazards to pollution are two points. First, our respondents do not see pollution as a social problem, or as connected to other social problems in the community. It tends to be seen as a thing in itself, something one has to "live with." There appears to be a definite correlation between length of residence in the area and salience of the pollution problem. The respondents in our sample who were most aware of pollution and outspoken on the issue were those who had lived in or near Clairton for less than five years.

A second point to be made is that our respondents consistently refused to blame the mills for the pollution or to criticize the company for its foot-dragging abatement policy. There is criticism of the company, but always on other issues. The baker's wife, for instance, said of the steel mills:

> They could do more, they could give more financially to the city to give more recreational help. If the steel company would put an effort in Clairton - I don't think Clairton would want a large hospital, but a small one, something in the community type hospital.. . . I believe if the steel company would create crafts, something for the younger generation to do with their hands, keep them occupied, I believe they would keep out of trouble.

A young steelworker thought the mills could do more to help the local schools provide adequate job training:

> Now this mill does sponsor different programs but they don't sponsor it to a younger generation. They have night schools they sponsor. So I was asking [the father of a friend of mine], would he, since they have by-products here, they have chemistry

> labs here, they have electricians - advanced electricians, a machine shop here that is really advanced - where they turn the rolls out for forging steel, would he be able to have these people come to Clairton High School.. . . When I was in it, nobody told me, "We have these kinds of jobs available in the mill."

The black minister criticized the company's hiring policy:

> No, very little new businesses moving in. The only way that I see it could be corrected is that U. S. Steel change their hiring policy, because they'll hire you from California, or off the street. I really think they should give preference to the citizens of Clairton which is not being done. . .

and outlined what he thought the company ought to be doing:

> [Local residents] complain about [the hiring policy] because all the officials, they feel, couldn't care less. The high-ups in the administrative offices don't live in Clairton, they just come in Clairton and work and leave, so they couldn't care less as far as they're concerned about the conditions in Clairton.. . . I feel that if some of the high-ups in U. S. Steel would live in Clairton where they make their living, I believe this would be a better town. And they feel that U. S. Steel can make it, and I do too, Clairton a model city. They have the power to do it, they have the money, the resources. . .. They employ some of the citizens of Clairton and then they pay taxes. But really coming in and being a big brother, that's what we really need them to be . . . a friend, a big brother, and they're not. They're all business. . ..

When our respondents were asked specifically if they thought the mills should be doing more to clean up pollution, they unanimously defended the company on the grounds that it was doing its best and that such things take time. An older woman, whose husband had been a millworker, said, for instance:

> They are doing something about [the pollution]. They're fined every time it's done, every time the pollution's high they're fined, but as I said, they're a coporation, if people want to make a living you have to put up with a bit until they can get something done, and do it right. You can't blame U. S. Steel; they're trying.

The Glassport auto mechanic agreed that they should be given plenty of time:

> I know if I would have anything to do [with it] I'd have the least restriction toward the company because the company employs a lot of people and we all benefit from it. And I'd

> say in time, not next month or next year, we want this smoke cleared out of here. I'd give them a good long 20 or 40 years, see how much they can accomplish.

The defensiveness exhibited when pressed to respond to questions about pollution abatement is, of course, consistent with the earlier noted view that talk of pollution is the work of outside agitators. It is also closely related to the historical circumstances of employment in a mill town. The following exchange illuminates this relationship:

> Q. What do you think would happen if the federal government said there were certain regulations that had to be enforced?
>
> A. The steel mill would go along with it. They're not hard to get along with. I think it's the thing that you can only take so much time to do so many things. And you can't say this has been going on for 70 years, fix it in 2 days, fix it in 2 years. These people have responsibilities too, they have a profit and a loss game too. If you close these mills down here, the town is closed, there's no town period. This and PICCO are the only what I would say really employers here. The other small ones, stores and other things, they couldn't even exist without this because nobody would buy here so you couldn't employ anybody to work there. You couldn't even open a store here.

Note that while the interviewer merely mentions enforcement of federal regulations, the respondent's mind immediately jumps to the image of closed mills and a closed town, which to him is the most feared result of pollution abatement. Our respondents were unable to imagine abatement in any terms other than closing of the mills. Historically, in the Monongahela Valley, the smoke from the steel mills is associated with employment. Here is an older man's recollection of the Depression:

> I know that back before '38, say from '30 to '38, you used to look down over the hill, J & L, you could see a nice clear day, but there was nobody at work. Used to get in line for free potatoes, or a couple lumps of coal; then I know for a fact that in 1938 when things started picking up, you'd see the smoke start coming up. Nobody worried about pollution then; they worried about work.

And we recall the passage quoted earlier, "That's big jobs pollution gives us." The younger generation of steelworkers feels just the same way:

> You know Clairton is a big thing in the news about pollution. We sometimes criticize people like GASP for doing what they do. But all in all they're trying to help us out. But us being steelworkers and that being our job, you know we would criticize them - knowing that it's good for us what they're trying to do but we still wouldn't want any slack because a slack in work means a slack in your paycheck and some people, most everybody's, life that works for the mill is centralized around that paycheck.

The women too support this point of view, as shown in this exchange:

> Q. Do you think most people are satisfied with the mills being in the city?
>
> A. Well, what would you have but a ghost town if it wasn't here? I don't know too much about ghost towns, but if it wasn't here, forget it.
>
> Q. I suppose most people have the same opinion about it? Have you heard any complaints about them?
>
> A. I've heard lots of complaints about the pollution and stuff like that. But which is the best - pollution or nothing? Starve to death, one or the other.

These residents of the Clairton area, who see their lives dependent on the steel industry, and thus on the continued "smoke" from the stacks, do not consider the possibility of technology, existing or to be developed, which might abate the pollution while retaining current employment levels. Nor do they give any weight to the vital relationship between the coke works and all the Mon Valley steel mills for which it provides coke and coke oven gas. Their belief is, quite simply, that if pressed too hard, the company will shut down and move elsewhere.

One steelworker was particularly sarcastic about the fines which the company has had to pay for violating the air pollution regulations:

> It seems to me they're just bickering because when they charge Clairton with a whole lot of violations, pollution violations, then they'll fine them $5,000, $10,000, well that's a drop in the bucket. U. S. Steel is so big, what is $10,000? Or $50,000? Hey, even millions! They make money constantly, twenty-four hours a day. To me that's a farce. Why would you just fine somebody $5,000 for a violation of a person's health, and they go right back out and do it. That's just like giving somebody probation or fining them $25 for killing a person. Cause in the long run that's what it's doing. No one would really say it but inside they believe it.

To sum up this overview of Clairton's problems, our respondents exhibit considerable unanimity in naming certain outstanding social problems - racial tension, welfare abuse, schools, drugs, lack of recreational facilities - and some disagreement over the importance of such issues as medical care, shopping facilities, housing and urban decay. Although the existence of pollution is seldom regarded as being among the foremost of the community's problems, and, as we have seen is perceived as a means of attacking the community by outside forces with hidden motives, there is no one in our sample who does not recognize its existence or perceive it to have specific physical effects. They do, however, generally defend the company's good intentions in this area, a defense clearly related to fears for their own economic security.

Positive Attitudes About Clairton

"Everybody Knows Everybody"

When asked what it is they <u>like</u> about living in Clairton, our respondents give a clear and consistent answer. The positive aspect of life in Clairton is that it is a real community, where the individual is known and respected and has put down roots. Sometimes this is expressed in a highly emotional manner. The black minister in our sample, who had lived in the community for only eleven years, said:

> I like the closeness of Clairton even though we have our problems. In the time of emergency or tragedy we are one, whether we are black or white, Jew or gentile, we're very close together. We're concerned about one another. Yes, we fight over the political table, we fight concerning the race issue, and so forth. But over all, I would say Clairton is a closely knit community where people really love each other. It's just like a family where you have your family problems, but when one person is in need, we all join in. I like that. After coming from Columbus, something I really wasn't used to was being on speaking terms with everybody. Everybody knows everybody in Clairton. I really like the closeness. We have crime in Clairton like other cities but I don't think as much because - for instance, where I live everybody knows everybody. If a stranger's in the area, they just know it. So it would be hard for somebody to just come in. I've never heard of anybody breaking in on this side of town, white or black. I like that.

Sometimes it is purely in terms of personal relationships:

> I don't have any one reason why I'd want to leave Clairton. My husband says, "I'd rather be in Clairton and be recognized as Mr. A. than to be in some big city and not be recognized by anyone." I have fellows, they went to school with my sons, they recognize me. I went shopping the other night for some groceries, "Mrs. A., how are you?" Recognized by so many people. We have been so many years that if I didn't know them, my sons knew them or had them as friends, so therefore we are senior citizens here. I think my husband enjoys that the most, being recognized as who he is.

And similarly:

> Q. When visiting these other places, have you ever seen any place you thought you might like to move to?
>
> A. Yeah, Las Vegas! I was out there last year for a week. It's nice out there. There's a lot of nice places, but I'll tell you one thing right now, when I retire, I'm not going to move anywhere. I'm going to stay right here in Clairton. This is where all my friends are. They can still have that pollution, it ain't going to bother me. I can't see moving to Florida or someplace else to make new friends; I'd rather have old friends.
>
> Q. Would you say that's the most important thing?
>
> A. I think older friends are more true to you than newer friends. Well, we make a lot of good new friends too.
>
> Q. Would you say that's the thing you like most about Clairton?
>
> A. The people? Right! I know a lot of people; a lot of people know me, and I get along with most all of them. We got a pretty good town here.

This sense of community is apparently characteristic of the area. There is a similar comment from Glassport across the river:

> People live here because they've lived here all their lives, and their families have lived here. And once you've lived here, your kids get attached to it. . . it's a community way of life, everybody knows everybody, very few people you don't know.

What is notable about this consistent response is that it seems to be the major force by which people justify continuing to live in the area. And it must be a potent force indeed for there is strong evidence in our

interviews that this feeling of belonging is a major reason for not leaving the community. This community spirit appears to be made up of a number of elements. First, many of our respondents share nationality backgrounds which emphasize close family ties. As the Yugoslav baker said, when asked if he'd ever thought of moving from Clairton, "How am I going to move? Move all my children?" Secondly, one might hypothesize that they are engaged in a continual battle against local environmental and social forces which pulls them together.

There is, for example, a high level of involvement in community activities, by the adult population at least. Almost all of our respondents were active in some local organization: American Legion, VFW, Little League, Boys' Club, PTA, church groups, and unions. Another aspect of this involvement is the defensiveness against outside critics which we have described above, and which is particularly true in the case of pollution. This amalgam of attitudes, pride in the community, realistic assessment of some social problems and denial of others, defensiveness and despair, is eloquently summed up in this exchange:

> Q. Do you think anything can be done to improve the quality of life in Clairton to a point where you wouldn't want to leave?
>
> A. Well, I was talking to a man last night and we were discussing our views on Clairton and I told him I wanted to leave. . . and he said, "Tom, the best thing to do is not to leave. Stay and fight it." But sometimes you can buck your head up against a brick wall and think you're accomplishing something; all you're doing is beating your brains out. So, something definitely can be done. The town is not in such bad shape that a shot in the arm won't help. But where that shot in the arm is going to come from, or how it's going to come, or when it's going to come, hey, that's undetermined. And if it doesn't come, soon, anybody can tell you, the town will just fade away.
>
> Like there used to be, just take an approximate number, there was 20,000 people in Clairton say in 1965 or '63. Now there are 12,000. So 8,000 people have moved out. Why? See there had to be a reason. We'll say pollution, maybe their kids could get a better education somewhere else, but there was a reason for these people leaving, the exodus from Clairton. And until we can find out why and put a stop to it, it'll continue.
>
> I would like to see Clairton do right. Like when I told my mother I was going to stay down here and live and work and try and bring up my family, she said, "Wow, Clairton!" She

says she had lived there long enough and she didn't want any part of that dirty town again - the mills, the streets, the people. She may have been a little bigoted, a little prejudiced in her thought, but some of it was right.

APPENDIX D

EXPLANATION OF QUESTIONNAIRE DESIGN

Material collected in the first portion of the questionnaire, questions 1-10, 12, has a number of purposes: it will enable us to test representativeness, and to divide the population by various characteristics, including age and social class (using a variation of the Hollingshead Index of Social Position).

Question 11 represents the researchers' efforts to develop a measure of job satisfaction that would be simple and direct. It represents a derivation from a number of sources, none of which can be directly credited with having used this particular form.

Question 14 is adapted from the scale originally devised by V. Davies "The Development of a Scale to Rate Attitudes of Community Satisfaction," Rural Sociology 10 (1945): 246-255, and modified by C. J. Jesser, "Community Satisfaction Patterns of Professionals in Rural Areas," Rural Sociology 32 (1967): 59-69. This is one of the few measurements of community satisfaction that have been replicated and revised over time, and should provide a good basis for an index. It has been especially applied to measure differential response, and therefore is useful for our purposes. In our adaptation, the scale has been shortened to its present 26 items, from the 42 used by Jesser.

Question 15 was used by Roper in Minnesota, 1955, (cited in N. C. Dalkey, R. Lewis, and D. Snyder, Measurement and Analysis of the Quality of Life, Rand Corporation, Santa Monica, 1970, pp. 20-21) and is well validated as a measure of perception change. This question may also form the basis for cross tabulation of the population.

Question 16 is a measure of alienation from societal norms used by R. Middleton, "Alienation, Race and Education," American Sociological Review 28 (1963): 973-977. Again, we have chosen to eliminate some questions from the original since they do not appear to serve our objectives. Combined with

the alienation questions is a series of items from N. Levinson and P. Huffman, "Traditional Family Ideology and Its Relation to Personality," Journal of Personality, 23 (1955): 251-273, designed to measure authoritarianism in family life.

Question 17, we feel, is a most interesting attempt to develop an index of perception of the quality of life, and is derived from the work done at the Rand Corporation, under a grant from the Department of Transportation (see Dalkey et al., cited above). The Rand study, using a well-organized Delphi technique, arrived at a series of dimensions which characterized definitions of the "quality of life." We have carried this work a step further by translating their definition into a questionnaire item, on a scale intended to measure both current perception and "hopefulness." Although the question is not yet validated, we believe it may be most effective, particularly in differentiating responses among communities. It has been developed in a manner which is easily indexable.

Items 18-20 are questions developed by the research team for the purpose of exploring response in the community toward those who emigrate. Clairton is characterized by a declining population, and our depth and group interviews suggest considerable resentment (or jealousy) toward those who move. This question will be of interest also in comparative studies of communities at different pollution levels.

Question 21 is a measure devised by the research team to explore the perception of the ordering of priorities in the community.

Question 22 is again an attempt to measure the reception of criticism of the community.

Questions 23-28, devised by the research team, explore aspects of the response to pollution and its institutional sources which we believe, based upon our analysis of the group and depth interviews, might provide useful evidence on attitudes toward pollution as it relates to both economic and general living conditions in our test communities.

Questions 29-30 on drinking behavior and TV-watching, and question 13 on "happiness" are directly taken from questionnaires devised by N. M. Bradburn and D. Caplowitz, (Reports on Happiness, Chicago, 1965) for which adequate reliability and comparative data are available. Question 31 is designed to verify, on a 5-point scale, responses to question 13.